

A SYSTEMATIC REVIEW OF THE GENUS *ANEURUS* OF NORTH AND MIDDLE AMERICA AND THE WEST INDIES (HEMIPTERA: ARADIDAE)

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Quaestiones Entomologicae

13: 255-308 1977

The 32 known species of *Aneurus* Curtis, 1818, that occupy the Western Hemisphere are treated taxonomically, with the following provided: key to species; synonymy; diagnoses; descriptions of species based on structural features of adults; data on geographical distribution; and lists of localities. Maps illustrate distribution patterns. Structural features of these insects are illustrated by line drawings and SEM photographs. Twelve new species are described, with names (and type localities) as follows: *A. wygodzinskyi* (West Indies, Jamaica, "near Troy"); *A. hispaniolensis* (West Indies, Haiti, Roche Croix Mountains); *A. deborahae* (USA, California, Santa Barbara County, Gaviota Pass); *A. patriciae* (West Indies, Jamaica, Hardwar Gap, 4000'); *A. neojamaicensis* (West Indies, Jamaica, Barbecue Bottom); *A. roseae* (USA, Texas, Kerrville); *A. arizonensis* (USA, Arizona, Cochise County, Chiricahua Mountains); *A. borealis* (USA, Alaska, Fairbanks); *A. maryae* (Mexico, Michoacan, 3.4 miles east of Morelia); *A. usingeri* (Panama, Volcan de Chiriqui, 3000'); *A. slateri* (West Indies, Bahama Islands, Andros Island, Andros Town, Fresh Creek); *A. veracruzensis* (Mexico, Veracruz). *Aneurus septentrionalis* Walker, 1873 is a junior synonym of *A. simplex* Uhler, 1871. Adults of *A. pygmaeus* Kormilev and *A. minutus* Bergroth differ from one another in color pattern only, but the geographical ranges of the two taxa overlap broadly. They may be conspecific. The name *Aneurosome* (type species of this taxon *Aneurus dissimilis* Bergroth) is regarded as a junior synonym of *Aneurus*. Members of this genus live under bark of dead trees, where they probably eat the fungi growing in such places. In the tropics these bugs inhabit mountain forests. In temperate areas, they inhabit the lowlands. Character states are classified as plesiomorphic or apomorphic, and a reconstructed phylogeny is presented, which serves as the basis for arranging the species in the text. The pattern of geographical distribution and the reconstructed phylogeny suggest that the New World species are descendants of a tropical-adapted ancestor, although nine of the extant species are confined to temperate areas. The West Indian archipelago has been invaded at least five times, and at least two stocks (one, including *A. hispaniolensis*, *A. haitiensis*, and *A. vauriei*; and another, including *A. aibonetensis* and *A. neojamaicensis*) have undergone differentiation in the Greater Antilles.

Nous reconnaissons 32 espèces d *Aneurus* Curtis, 1828 dans l'hémisphère occidentale. Dans ce travail taxonomique nous pourvoyons une clef des espèces; une synonymie; un diagnostique; une description des espèces basée sur les caractères structuraux des adultes; et une distribution géographique suivit de la liste des localités. Les patrons de distribution sont illustrés à l'aide de cartes géographiques. Les caractères structuraux de ces insectes sont illustrés par des dessins et de photographie obtenues du microscope électronique à balayage. Nous décrivons douze nouvelles espèces et leur localité type comme suit: *A. wygodzinskyi* (West Indies, Jamaica, "near Troy"); *A. hispaniolensis* (West Indies, Haiti, Roche Croix Mountains); *A. deborahae* (USA, California, Santa Barbara County, Gaviota Pass); *A. patriciae* (West Indies, Jamaica, Hardwar Gap, 4000'); *A. neojamaicensis* (West Indies, Jamaica, Barbecue Bottom); *A. roseae* (USA, Texas, Kerrville); *A. arizonensis* (USA, Arizona, Cochise County, Chiricahua Mountains); *A. borealis* (USA, Alaska, Fairbanks); *A. maryae* (Mexico, Michoacan, 3.4 miles east of Morelia); *A. usingeri* (Panama, Volcan de Chiriqui, 3000'); *A. slateri* (West Indies, Bahama Islands, Andros Island, Andros Town, Fresh Creek); *A. veracruzensis* (Mexico, Veracruz). *Aneurus septentrionalis* Walker, 1873 devient un synonyme plus récent d'*A. simplex* Uhler, 1871. Les adultes d'*A. pygmaeus* Kormilev et d'*A. minutus* Bergroth diffèrent les uns des autres dans leur patron de couleur seulement, mais leur distribution se recouvre largement. Il est possible que ces deux espèces ne soient membres que d'une seule espèce. Nous considérons le genre *Aneurosome* (espèce type: *Aneurus dissimilis* Bergroth) comme synonyme plus récent du genre *Aneurus*. Les membres de ce genre se rencontrent sous les écorces d'arbres morts où

probablement ils se nourrissent de noisettes qui sont abondantes dans un tel habitat. Dans les régions tropicales ces insectes se rencontrent en forêt de montagne, et dans les régions tempérées on les trouve dans les terres basses. Nous classifions les états d'un caractère comme plésiomorphe ou apotypique. Nous présentons une reconstruction phylogénétique qui sert de base dans l'organisation des espèces dans le texte. A partir des données de la distribution géographique et de cette phylogénie reconstruite nous suggérons que les espèces du Nouveau Monde sont venues d'ancêtres adaptés aux climats tropicaux, malgré que neuf des espèces présentes ne se rencontrent qu'en régions tempérées. Les Antilles ont été envahies au moins cinq fois. Au moins deux lignées (l'une incluant *A. hispaniolensis*, *A. haitiensis* et *A. vauriei*; et l'autre avec *A. aibonetensis* et *A. neojamaicensis*) se sont différenciées dans les Grandes Antilles.

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INTRODUCTION

The genus *Aneuris* Curtis 1828 is so morphologically distinct and isolated that Douglas and Scott (1865) treated it as a distinct family-group. Included in the Aradidae, it was treated as a monogeneric subfamily until 1959. The genus contains 89 described species and although predominantly tropical, has representatives in all major zoogeographic regions of the world.

Bergroth (1914) provided the first comprehensive work on *Aneuris*. Usinger and Matsuda (1959) provide a comprehensive description of structural features of the genus, and a list of included species. Much new material has recently become available which makes necessary further analysis of the taxa of *Aneuris* whose members inhabit the study area. To date, only limited phylogenetic analysis of *Aneuris* has been attempted. In this paper, characters are established for specific discrimination, and their apomorphic and plesiomorphic states are discussed to provide an introduction to the phylogeny of the species of *Aneuris* of the northern and central parts of the New World.

MATERIALS

Approximately 700 specimens representing 25 species were borrowed from collections of 19 institutions. Acronyms for the latter are:

- AMNH American Museum of Natural History, New York, 10024
- ANSP Philadelphia Academy of Sciences, Philadelphia, Pennsylvania, 19103
- BM British Museum (Natural History), London, SW7
- CAS California Academy of Sciences, San Francisco, California, 94118
- CINC California Insect Survey, University of California, Berkeley, California, 94720
- CNC Canadian National Collection, Ottawa, Ontario, K1A 0C6

FMNH	Field Museum of Natural History, Chicago, Illinois, 60605
FSCG	Florida State Collection of Arthropods, Gainesville, Florida, 32601 and Homestead, Florida, 33030
INHS	Illinois Natural History Survey, Urbana, Illinois, 61801
IRSB	Institute Royal des Sciences Naturelles de Belgique, Bruzelles
JSSC	James Slater, personal collection, Storrs, Connecticut, 06268
LSU	Louisiana State University, Baton Rouge, Louisiana, 70803
NHRS	Naturhistoriska Riksmuseet, Stockholm
NMNH	National Museum of Natural History, Washington, D.C., 20560
OBTF	Charles and Lois O'Brien, personal collection, Tallahassee, Florida, 32307
OSU	Ohio State University, Columbus, Ohio, 43210
PALK	Peter Ashlock, personal collection, Lawrence, Kansas, 66045
PICCHI	V. Picchi, personal collection, Storrs, Connecticut, 06268
TAM	Texas A&M University, College Station, Texas, 77843
UBC	University of British Columbia, Vancouver, British Columbia, V6T 1W5
UCSC	University of Connecticut, Storrs, Connecticut, 06268
UKL	Snow Entomological Museum, University of Kansas, Lawrence, Kansas, 66045
USNM	National Museum of Natural History, Washington, D.C., 20560
UTAH	Utah State University, Logan, Utah, 84321

METHODS

Body proportions used in species descriptions are illustrated in Fig. 1. Measurements are in millimeters, and were made with an ocular micrometer. Illumination is critical because many characters such as spiracle patterns and scutellar rugosity are difficult to observe unless the light source is variable and moveable.

A camera lucida attachment was used for all drawings, which, except for the frontispiece, were made by the author.

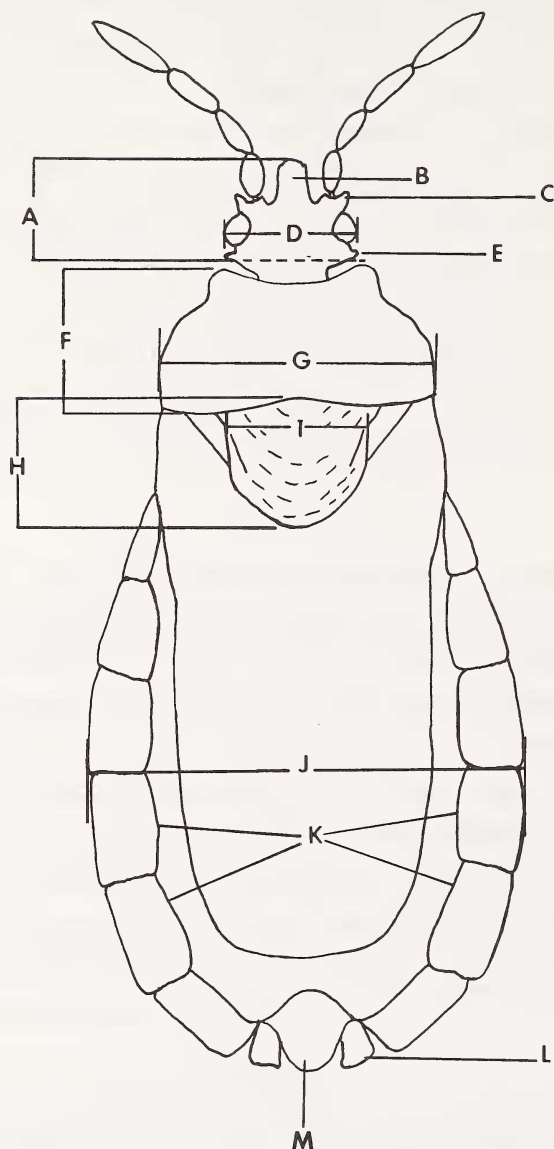
Genitalia dissections were made by removing the genital capsule from specimens softened in tapwater brought to a boil. The capsule was placed in a hot aqueous solution of potassium hydroxide for 5 to 10 minutes, rinsed in distilled water, and placed on a slide in a drop of melted glycerine jelly. The left paramere was removed and placed alongside the capsule and drawn. Glycerin used in a 1:1 mixture of liquid to jelly is a good medium for holding dissected parts for drawing. At room temperature it gels and holds objects in a given position which can be changed by heating the slide slightly to melt the glycerin, repositioning the specimen, and then allowing the medium to reset at room temperature.

Specimens prepared for observation with the SEM were coated with either gold or a gold-cadmium alloy.

Specimens chosen as holotypes were in good condition and from localities central to the ranges of their respective species. Where possible, a male specimen was designated holotype as males show more specific external characters than do females. Full descriptions of *Aneurus hrnyi* Štys 1975 and *Aneurus pisoniae* Kormilev 1968b are not included; no material was available for study at the time this manuscript was prepared, however, I used in the text, information from the original descriptions of these two species.

NATURAL HISTORY

Individuals of *Aneurus* species are usually found under bark of dead trees where they probably feed on fungi, the common food of aradids. The North American species of *Aneurus*



1.

Fig. 1. Schematic drawing showing measured proportions and diagnostic characters. A. Head length; B. Tylus; C. Antenniferous tubercles; D. Head width; E. Post-ocular tubercles; F. Pronotal length; G. Pronotal width; H. Scutellar length; I. Scutellar width; J. Abdominal width; K. Connexival suture; L. Abdominal segment VIII (♀); M. ♂ Genital capsule.

are most often associated with deciduous trees. No careful investigation has yet been undertaken to identify the actual host fungi, the specificity of fungi to their host plants, or relationships of *Aneurus* species to either or both. Therefore, the distinctive habits of these species are virtually unknown.

Despite the widespread distribution of some species, the weak, membranous wings suggest adults are poor fliers.

Adult *Aneurus* specimens have been collected in every month of the year in the New England area. I collected *Aneurus inconstans* in Connecticut, most frequently in logs cut for less than a year. This suggests that the presence of *Aneurus* species may be related to fungal succession processes in the wood. Change in fungal components in various stages of log decay may be a key to a possible partitioning of the habitat by various partially sympatric *Aneurus* species.

EXTERNAL STRUCTURE

Studies with the Scanning Electron Microscope

An extensive study of *Aneurus inconstans* Uhler with SEM, revealed several structural features, the functions of which are not clear. They are published here to stimulate thought.

Figures 7, 8 and 12 illustrate characteristic surface sculpture.

Figures 9-11 show serial magnifications of the mid-ventral pregenital area of a male *A. inconstans*. Using light microscopy, previous authors referred to this area as glabrosity which extends the length of the mid-ventral abdominal surface. SEM micrographs show these areas are covered with posteriorly pointed triangular projections covering slight depressions. Glabrous areas on the lateral parts of the sterna are smooth.

Magnification of the external genitalia (♂, Fig. 10; ♀, Fig. 11) shows that sensory structures common along the lateral margins (Fig. 15) are here as well. Figure 11 also shows a typical abdominal spiracle opening.

The pulvilli are interesting in several hemipteran groups. Figure 13 shows a pulvillus and tarsus of *A. inconstans*. Figure 14 illustrates the tibia-tarsus area, with possible antennal cleaning structures and at least two distinct types of sensory projections.

Wing polymorphism

Wing polymorphism, so characteristic of other aradids, is not present to significant extent in any of the species of *Aneurus* examined in this study. Stys (1974) reports that some *Aneurus* adults shed their wings, as do adults of the aradid subfamily Isoderminae. I saw no evidence of such wing breakage or shedding in *Aneurus* specimens that I examined.

Taxonomic characters

Characters and measurements used for discrimination of taxa are illustrated in Figure 1 and 2.

Head. — Differences between species in head width/length ratios are small but significant. The most useful differences on the head are various sizes of antenniferous and postocular tubercles. Between species the condition of the antenniferous tubercles ranges from complete absence (Fig. 62), to slightly rounded lateral projections (Fig. 70), to well developed, acute, anteriorly projecting tubercles that reach the base of antennal segment I (Fig. 68). The postocular tubercles vary from completely absent (Fig. 62), to slight round lateral projections (Fig. 70), to elongate projections extending laterally beyond the outer margin of the eye (Fig. 58). Because of the rugulose surface of *Aneurus* species the tubercles in larger species often appear serrate on the lateral margins.

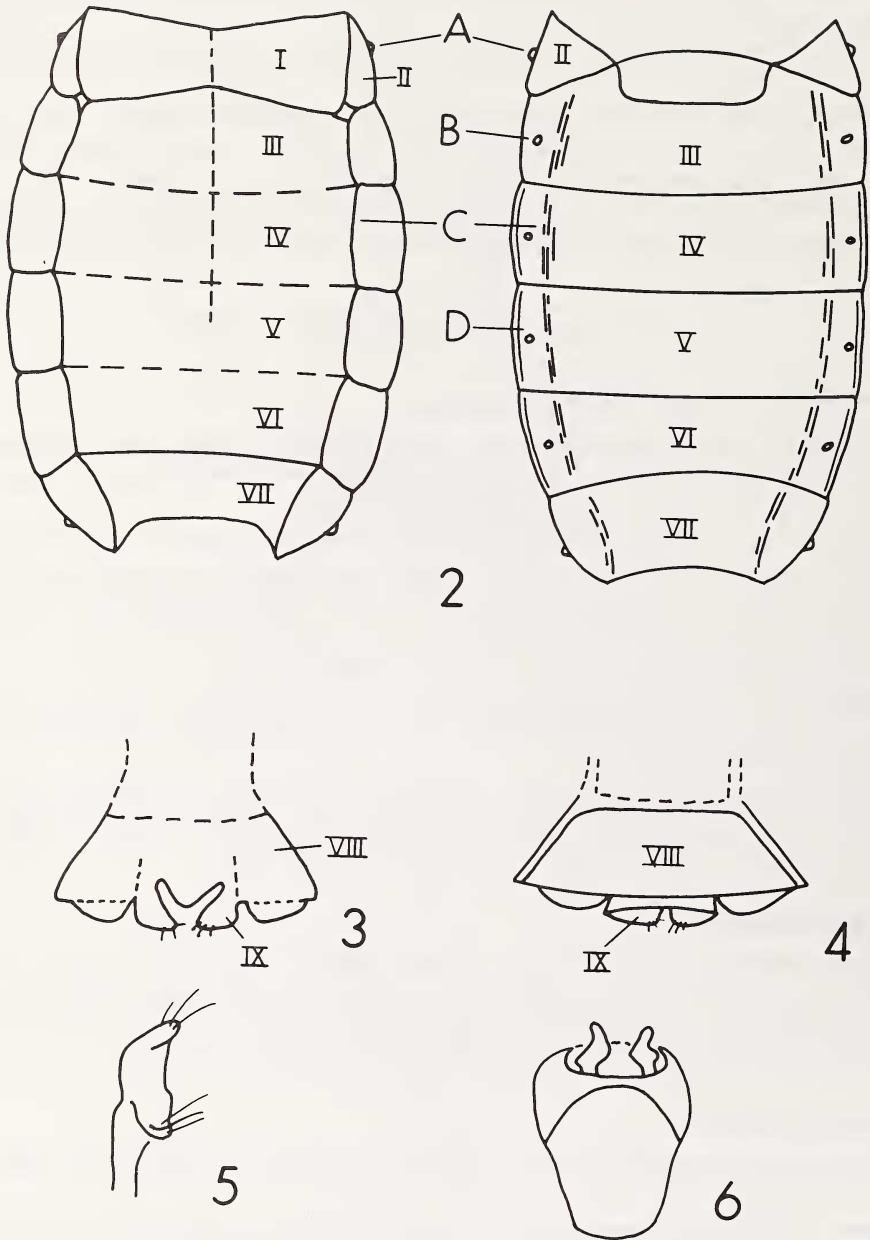


Fig. 2-6. *Aneurus inconstans* Uhler. Fig. 2. Abdomen showing spiracle positions; A. lateral spiracles; B. ventral spiracles and suture patterns of dorsal and ventral (right) surface; C. connexival suture; D. subventral fold. Fig. 3. External female genitalia partially dissected, dorsal view, showing abdominal segments VIII and IX modified as 1st and 2nd valvifers, respectively. Fig. 4. External female genitalia, partially dissected, ventral view. Fig. 5. Paramere. Fig. 6. Partially dissected male genital capsule showing paramere *in situ*, dorsal view.

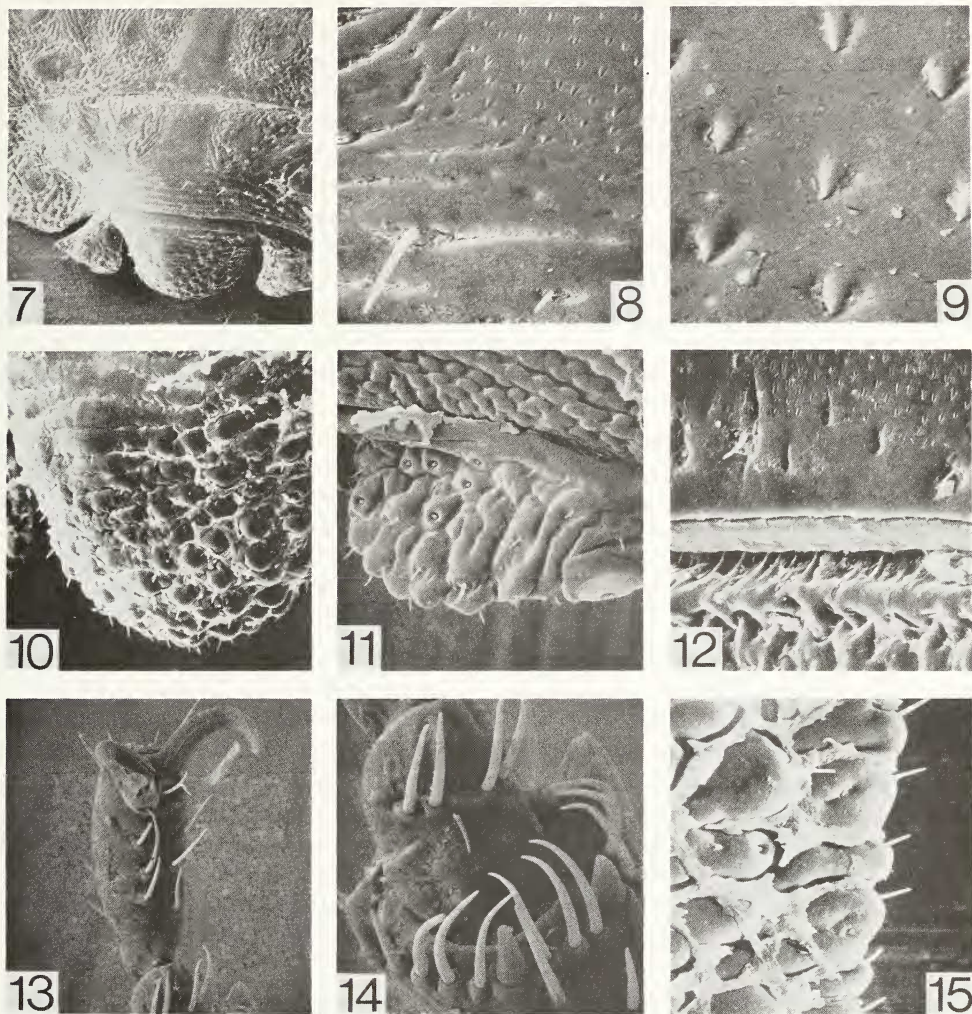


Fig. 7. Sterna VI, VII, VIII and genital capsule; (100x). Fig. 8. Mid-section of sternum VII; (1000x). Fig. 9. Further enlargement of sternum VII section; (5000x). Fig. 10. Ventral view of male genital capsule; (500x). Fig. 11. Segment 8 of female, showing sensory hairs and spiracle; (1000x). Fig. 12. Articulation of sterna III and IV; (1000x). Fig. 13. Pulvilli and tarsus of prothoracic leg; (1000x). Fig. 14. Tibia-tarsus area showing antennal cleaner and two types of sensory structures; (1000x). Fig. 15. Sensory hairs found concentrated along lateral margin of entire body; (1000x).

Antennae. — All *Aneuris* specimens have four-segmented antennae with segments I and II more rounded and III and IV more elongate. Shape and relative lengths of the segments vary. (Fig. 18-45).

Pronotum — The pronota are basically subtrapezoidal with minor variations in the serrate and sinuate conditions of the lateral margins.

Scutellum. — *Aneuris* specimens have small scutella. In all species except *A. dissimilis* (Fig. 108), the scutellum is short and rounded to either a subtriangular or semicircular shape. The clavus consists of two small triangular structures at the antero-lateral margins of the scutellum. *A. dissimilis* has a triangular scutellum and well developed, elongate clavus. What functions are served by the scutellum and clavus and how they are affected by this reduction in size and shape are unclear. The wings of *Aneuris* species are membranous with a rugulose surface which holds the very thin wings firmly in an overlapping position on dried specimens. If a fully developed scutellum and clavus hold the wings in place at rest, the wings themselves appear to have been modified to perform this function thus allowing reduction of the scutellum and clavus. Specific variation in the rugosity pattern of the scutellum is slight and requires an intense, movable light source to observe. Major patterns noted are mid-longitudinal ridges (Fig. 112), a medial ovoid callosity (Fig. 113), or a pattern of semicircular ridgelets paralleling the lateral and posterior margins of the scutellum (Fig. 121). In some species there are well developed anterolateral ridges just mesad of the scutellar margins (eg. Fig. 114).

Abdomen. — A most striking feature of this genus is the specific difference in spiracle pattern. Since abdominal segment I is not fully developed, the spiracles visible are counted from segment II through VIII. In North and Central American species of *Aneuris* spiracles II, VII and VIII are lateral (on segment VIII this gives the spiracles a terminal position). Spiracles III, IV, V and VI vary from: a lateral position, visible dorsally (Fig. 2A); to sublateral, near lateral margin but not visible from the dorsal surface (Fig. 148); to a fully ventral position (Fig. 2D).

The connexival suture of *Aneuris* species shows important specific differences. Although uniformly well developed on terga II through VI, on sterna II through VI the connexival varies from completely absent (Fig. 176), to a series of well developed parallel ridgelets (Fig. 179). On tergum VII the connexival suture is: 1) entire (Fig. 138), 2) sinuate, encircling a callosity (an apodemal impression) and forming a pseudosegment (Štys' (1974) PTG, paratergite, or PST, parasternite) (Fig. 151), or 3) forked, usually around a callosity (Fig. 185). On sternite VII one of these three conditions are present or the suture is absent entirely or poorly developed as a faint series of parallel ridgelets.

The condition of the ventral sub-lateral fold (which forms the medial border of Štys' (1974) "hem") varies interspecifically from absent (Fig. 161), to weakly developed (Fig. 211), to well developed (Fig. 160).

Genitalia. — Although not truly a genitalic structure, in *Aneuris* abdominal segment VIII is strongly sexually dimorphic and discussed with genitalia by most authors. Segment VIII of the male appears externally to be two segments but is internally connected by a weakly sclerotized ring. It varies in shape from cylindrical to rectangular and flattened dorsoventrally, to a flat deltoid segment. Štys (1974) refers to the male abdominal segment VIII as urite 8.

The male genital capsule shows excellent specific differences, varying from short, (not as long as abdominal segment VIII) (Fig. 133), to more than twice the length of segment VIII (Fig. 135). In most species it is rounded; however, in some it is moderately flattened dorsoventrally.

The parameres of *Aneuris* show little variation among species. The aedeagus when expanded shows interesting sclerotized hook patterns on the conjunctival appendages but due to a lack of material and the infrequent success met with in inflating aedeagi, no comparison between species is made here.

Table 1. Phylogenetic Classification of Character States and Their Distribution Among the Species of *Aneurus*

SPECIES NAME	antennae	antennif. tubercles	postocular tubercles	pronotal lateral projection	scutellum shape	dorsal connexival suture (♂)	ventral connexival suture (♂)	dorsal connexival suture (♀)	ventral connexival suture (♀)	spiracle pattern	surface	♂ abdominal segment VIII	♂ genital capsule
<i>dissimilis</i>	P	P	P	A	P	I	A	I	P	P	A	P	P
<i>wygodzinskyi</i>	P	P	I	A	A	-	-	P	A	A	I	-	-
<i>politus</i>	P	P	P	A	A	P	A	P	P	A	I	I	P
<i>tenuis</i>	P	P	A	P	A	P	A	P	A	A	P	A	P
<i>leptocerus</i>	P	P	I	A	A	P	A	P	P	A	P	I	P
<i>hispaniolensis</i>	P	P	P	A	A	-	-	I	P	I	I	-	-
<i>haitiensis</i>	P	P	P	P	A	I	A	I	P	I	A	I	I
<i>vauriei</i>	A	I	A	A	A	I	A	P	P	I	I	I	P
<i>deborahae</i>	P	I	P	A	A	-	-	P	P	I	A	-	-
<i>pygmaeus</i>	A	I	P	A	A	P	P	I	P	-	A	P	A
<i>minutus</i>	A	I	P	A	A	P	P	I	P	-	A	P	A
<i>patriciae</i>	P	I	I	P	A	I	I	I	P	P	I	I	P
<i>aibonitensis</i>	A	I	A	A	A	I	A	-	-	I	A	A	I
<i>neojamaicensis</i>	A	P	I	A	A	I	A	I	P	I	I	I	P
<i>championi</i>	P	I	A	P	A	I	A	I	P	I	I	I	I
<i>simplex</i>	P	P	A	A	A	I	A	I	P	I	I	I	A
<i>roseae</i>	P	P	P	A	A	I	A	A	P	I	A	I	P
<i>froeschneri</i>	A	I	I	A	A	I	A	I	P	I	I	P	A
<i>arizonensis</i>	A	A	A	A	A	I	A	I	A	I	A	A	A
<i>fiskei</i>	A	I	I	A	A	I	P	I	I	A	A	P	I
<i>inconstans</i>	P	I	P	A	A	I	A	I	I	A	A	P	P
<i>borealis</i>	P	I	I	A	A	P	A	P	P	A	A	A	P
<i>maryae</i>	P	I	I	A	A	I	A	I	P	A	A	P	P
<i>pusillus</i>	P	I	I	A	A	A	A	A	A	I	A	I	P
<i>usingeri</i>	A	I	I	A	A	I	A	I	A	I	A	I	A
<i>montanus</i>	P	I	P	A	A	I	A	I	I	A	A	I	P
<i>slateri</i>	A	A	P	A	A	I	A	I	A	I	A	I	P
<i>veracruzensis</i>	A	I	I	A	A	I	A	-	-	I	I	A	A
<i>barberi</i>	P	P	P	A	A	-	-	I	P	I	-	-	-
<i>hrdyi</i>	P	P	P	A	A	I	-	I	-	-	I	P	P
<i>nasutus</i>	P	P	P	A	A	I	A	-	-	I	P	I	I

P = plesiomorphic, A = apomorphic, I = intermediate condition

antennae: P = longest, A = rounder

antenniferous tubercles: P = undeveloped, A = well developed

postocular tubercles: P = undeveloped, A = well developed

pronotal lateral projections: P = present, A = absent

scutellum shape: P = triangular, A = rounded

dorsal connexival suture, ♂: P = forked, A = reduced

ventral connexival suture, ♂: P = forked, A = reduced

dorsal connexival suture, ♀: P = forked, A = reduced

ventral connexival suture, ♀: P = forked, A = reduced

spiracle pattern: P = lateral position, A = ventral position

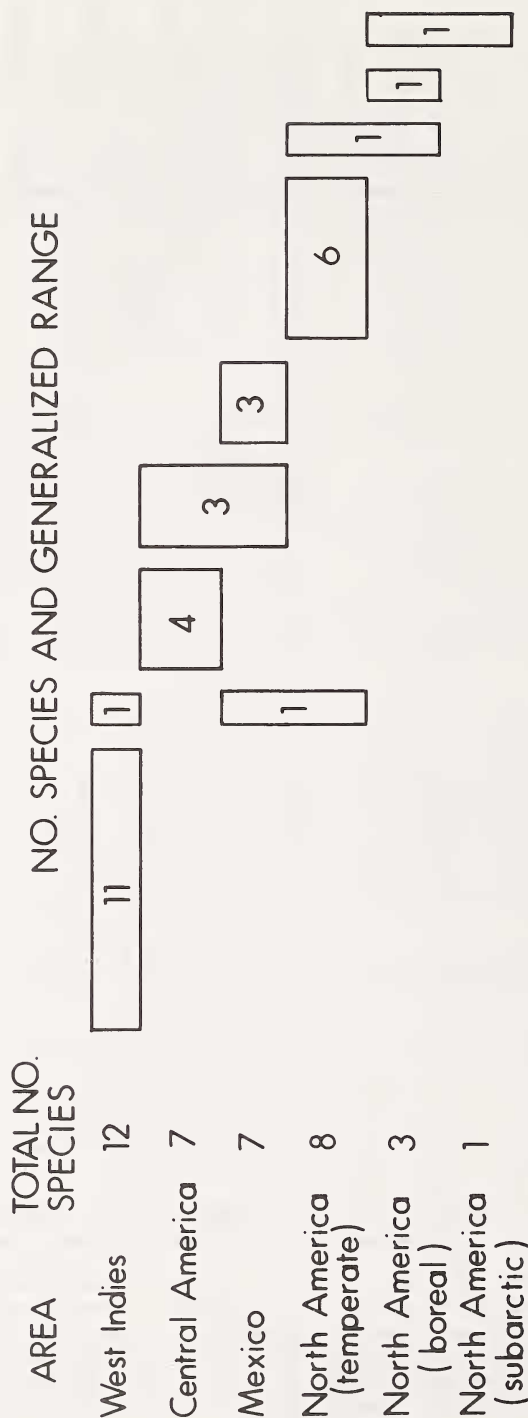
surface: P = smooth, A = rugulose

♂ abdominal segment VIII: P = cylindrical, A = deltoid

♂ genital capsule: P = elongate, A = short

Fig. 17

**DISTRIBUTION PATTERN OF ANEURUS SPP. IN THE WEST INDIES,
AND IN MIDDLE AND NORTH AMERICA**

Fig. 17. Distribution of *Aneurus* spp in the West Indies and in Middle and North America.

There is little specific variation in the female external genitalia. For further discussion of structure of the female reproductive system in *Aneurus* and its relationship to that of other Aradidae, see Usinger and Matsuda (1959) and Štys (1974).

PHYLOGENY

The holophyly implied in the proposed phylogeny shown on page 263 may be misleading. It must be remembered that until the role of the Palaearctic and South American *Aneurus* faunas has been considered, this reconstruction is tentative. The phylogeny was derived on the basis of 13 morphological characters which I have scored as plesiomorphic or apomorphic as shown in Table 1.

I scored as plesiomorphic those conditions that *Aneurus* spp. share with the Prosymptiestinae and Isoderminae, the two most primitive aradid subfamilies. A plesiomorphic *Aneurus* sp. is elongate, smooth surfaced and has forked connexival sutures on both dorsal and ventral surfaces.

Sensory structures are concentrated along the lateral margins (Fig. 15). Increase in these lateral areas, like developed head tubercles and rounded antennal segments increase sensory areas without significantly increasing bulk on the body. Therefore, I have interpreted developed tubercles and abdominal flares as apomorphic. The *A. froeschneri-veracruzensis* group most consistently shows these characters in their advanced states.

The rounded scutellum and reduced clavus are a widespread loss phenomenon characteristic of members of all but one species in the genus. The triangular scutellum and elongate clavus of *A. dissimilis* is an interesting unique retention of a plesiomorphic condition.

The abdominal spiracle pattern varies at the species level. Because most aradid species have a ventral spiracle pattern: increase in number of spiracles in a lateral position is scored as apomorphic. Again the *A. froeschneri-veracruzensis* complex generally shows the more apomorphic states while the *A. hispaniolensis-roseae* complex shows predominantly intermediate conditions.

Variations of the connexival sutures represent the clearest indications of loss. This character, generally stable in other hemipteran groups, varies between *Aneurus* spp. The more primitive forms show a relatively complex sinuate and forked condition involving partial loss of the connexival suture from sternum VII and the more derived condition involves total loss of the connexival suture on sterna VI and VII.

The subventral fold exhibits reduction. I treated this character as analogous to a surface rugosity and interpreted the condition as primitive when the fold is present and well developed on all abdominal sternites and as more derived when it is poorly developed or totally lacking from sterna V to VII.

In developing the accompanying cladogram I weighed heavily connexival suture reduction as this seems the most definite character to interpret in terms of apomorphy. I question placement of several species because representatives of both sexes are not available or because their status as species is uncertain.

The cladogram suggests four species groups within North America; *A. dissimilis*, *A. wygodzinskyi-leptocerus*, *A. hispaniolensis-roseae*, and *A. froeschneri-veracruzensis*. Because of the geographic limitations of this study I avoided use of subgenera.

ZOOGEOGRAPHY

The genus *Aneurus* is cosmopolitan, ranging in the New World from the tropics to subpolar areas. Most of the known New World species are tropical. The West Indies has a relatively rich

and divergent fauna. On the mainland, the overall pattern seems to be one of subtraction northward, but there are more species in temperate North America than would be expected from a simple subtraction pattern. This pattern may be an artifact, resulting from inadequate collecting in Middle America, and/or it may be because the North American fauna is comprised of Palaearctic elements as well as elements with neotropical relationships.

Within the West Indies, most of the species of *Aneurus* are known from the Greater Antilles, but one species is known from Bermuda and several from the Lesser Antilles.

In Middle America most *Aneurus* species range from southern Mexico through Panama, inhabiting almost exclusively mountainous tropical areas.

America north of Mexico equals the West Indies in number of species of *Aneurus*; however, most of these species (eight) are limited to temperate southern United States. Two species are strictly boreal. A third boreal species has been collected as far north as the Arctic Circle.

The midwestern area of North America seems to lack *Aneurus* species. This may be due to absence of forests, or less likely, lack of collecting in this region. Limited collections render uncertain the limits of ranges of the included species. Because of this and lack of phylogenetic analyses of *Aneurus* in other parts of the world particularly South America and the Palaearctic Region, explanations for the North American species distributions are provisional.

Total numbers of species and phylogenetic analysis indicate the North American *Aneurus* fauna originated basically as a series of northern invasions from tropical South American stocks. Because of the relative phylogenetic distance between the species currently found in the West Indies, these northern invasions must have distributed fingers probably through Middle America into the Caribbean at least four or five times. At least two of the temperate species reinvaded tropical areas (*fiskei*, and *politus*). Little is known about relationships of South American *Aneurus* species. Several species of the Lesser Antilles whose affinities are uncertain may have originated in South America.

The northern boreal species seem to represent northern limits of southern invasions. Until Palaearctic elements are further studied, southern origins for North American *Aneurus* are indicated, however.

The speciation effects of glaciation in addition to the multiple northern invasions are indicated by the high numbers of species, many of them with very restricted distributions in temperate North America.

I suspect with a worldwide phylogenetic analysis the picture may change to include some Holarctic exchange based on the strong mountain affinities of some of the North and Middle American species.

KEY TO *ANEURUS* SPECIES OF NORTH AND MIDDLE AMERICA AND THE WEST INDIES

- | | | |
|---------|---|---|
| 1 | Clavus fully developed, reaching tip of scutellum, latter triangular with pointed apex (Fig. 108) - (Panama, South America) | |
| | <i>A. dissimilis</i> Bergroth, p. 270 | |
| 1' | Clavus greatly reduced to small triangle near anterolateral angle of scutellum, apex of scutellum arcuate (Fig. 109) | 2 |
| 2 (1) | All abdominal spiracles lateral (II through VII), visible from above (Fig. 146, 171) - (Jamaica, Cuba, Puerto Rico) | |
| | <i>A. patriciae</i> n. sp., p. 276 | |
| 2' | At least abdominal spiracle III not visible from above, (Fig. 147, 1972) | 3 |
| 3 (2) | Only spiracle III subventral, near lateral edge <i>A. hrdyi</i> Štys | |

3'	At least abdominal spiracle III ventral or subventral, not visible from above	4
4 (3)	Spiracle III subventral, with spiracles on other segments subventral or ventral	5
4'	Spiracle III ventral, spiracles on more posterior segments in subventral or ventral position	9
5 (4)	Spiracle IV subventral, not visible from above; V, VI, VII lateral, visible from above (Fig. 199, 225) - (Panama)	<i>A. pusillus</i> Kormilev, p. 284
5'	Spiracle V subventral, IV, VI, VII subventral or ventral (Fig. 178)	6
6 (5)	Spiracles II and V subventral, IV ventral, VI, VII lateral (Fig. 144, 169) - (Guadalupe)	<i>A. nasutus</i> Kormilev, p. 286
6'	Spiracle II, IV, V subventral II, VI, VII lateral (Fig. 178)	7
7 (6)	Length, 3.0 mm or less - (Guadeloupe)	<i>A. vauriei</i> Kormilev, p. 274
7'	Length 3.5 mm or more	8
8 (7)	Abdomen subovate, dark red-brown (Fig. 190, 216) (Haiti, Dominican Republic)	<i>A. hispaniolensis</i> n. sp., p. 273
8'	Abdomen elongate, lighter orange-brown (Fig. 150, 202) - (Bahama Islands)	<i>A. slateri</i> n. sp., p. 285
9 (4)	Spiracle IV subventral, on fold near lateral margin (Fig. 145, 170) - (Jamaica)	<i>A. neojaamaicensis</i> n. sp., p. 277
9'	Spiracle IV ventral	10
10 (9)	Spiracle V ventral, not visible dorsally; equi-distant from lateral edge with spiracles III and IV, or closer to lateral margin than III or IV	11
10'	Spiracle V lateral, visible dorsally	12
11 (10)	Spiracle V ventral, but located closer to lateral edge than III or IV - (Puerto Rico)	<i>A. pisoniae</i> Kormilev.
11'	Spiracle V ventral, equidistant with III and IV from lateral margin (Fig. 149, 174).	13
12 (10)	Length 4.5 mm or more; scutellum more ovoid, (Fig. 124) slightly inset; male with slight bulbous projection from posterior area of genital capsule (Fig. 149) - (northern United States and Canada)	<i>A. simplex</i> Uhler, p. 278
12'	Length less than 4.0 mm; scutellum more elongate, subtriangular (Fig. 102); male genital capsule evenly rounded posteriorly (Fig. 131) - Puerto Rico)	<i>A. aibonitensis</i> Kormilev, p. 277
13 (11)	Spiracles II - V ventral, equally distant from lateral margin, spiracles II, VI and VII lateral (Fig. 210)	14
13'	Spiracles III - VI ventral, equally distant from lateral margin, spiracles II and VII lateral (Fig. 213)	24
14 (13)	Length greater than 4.5 mm	15
14'	Length less than 4.5 mm	16
15 (14)	Postocular tubercles short, rounded, slightly developed, not extended to lateral margin of eye (Fig. 55); no subventral projections at midlateral margin of pronotum (Fig. 83) - (Haiti)	<i>A. haitiensis</i> Kormilev, p. 273
15'	Postocular tubercles well developed, extended to margin of eye (Fig. 50); subventral projections at midlateral margins of pronotum visible dorsally (Fig. 78) - (Guatemala)	<i>A. championi</i> Kormilev, p. 278
16 (14)	Head distinctly longer than width across eye (Fig. 48) - (St. Lucia)	<i>A. barberi</i> Kormilev, p. 286

16'	Head as wide or wider than long (Fig. 54)	17
17 (16)	Antennal segment II elongate, similar in shape to segment III rather than I, not obovate or subobovate (Fig. 26)	18
17'	Antennal segment II obovate or subobovate, more similar in shape to segment I than III (Fig. 38)	19
18 (17)	Abdomen elongate, width 1.5 - 1.7 mm; total body length 3.7 - 4.1 mm; scutellum narrowed posteriorly (Fig. 110) - (Mexico)	<i>A. froeschneri</i> Kormilev, p. 280
18'	Abdomen relatively wider; 1.8 - 2.0 mm, total body length 4.1 - 4.4 mm; scutellum rounded posteriorly (Fig. 107) - (California)	<i>A. deborahae</i> n. sp., 274
19 (17)	Abdomen without sublateral fold posterior to segment IV in either male or female (Fig. 177) - (Mexico, Panama, Guatemala)	<i>A. usingeri</i> n. sp., p. 284
19'	Abdomen with ventral sublateral fold on at least segments III through V in male and female (Fig. 173)	20
20 (19)	Abdomen with ventral sublateral fold absent posterior to segment V (Fig. 173) - (Texas)	<i>A. roseae</i> n. sp., p. 279
20'	Abdomen with ventral sublateral fold present at least on anterior half of sternite VI (Fig. 157)	21
21 (20)	Second antennal segment subobovate, more similar in shape to segment I than III (Fig. 19) - (Arizona)	<i>A. arizonensis</i> n. sp., p. 280
21'	Second antennal segment elongate, more similar in shape to segment III than I (Fig. 44)	22
22 (21)	Head elongate, almost as long as wide, length/width ratio of head less than 1:1.5 (Fig. 72) - (southern Mexico) ..	<i>A. veracruzensis</i> n. sp., p. 286
22'	Head obviously wider than long, length/width ratio greater than 1:1.5 (Fig. 60)	23
23 (22)	Color of body dark red-brown with white wing membrane - (southern United States)	<i>A. pygmaeus</i> Kormilev, p. 275
23'	Color of body yellow-brown with dark brown wing membrane - (southern United States)	<i>A. minutus</i> Bergroth, p. 275
24 (13)	Total body length 4.5 mm or less; rugulose, not shiny; antennal segment II obovate, more similar in shape to segment I than III (Fig. 25) - (United States)	<i>A. fiskei</i> Heidemann, p. 281
24'	Total body length more than 4.5 mm; rugulose or shiny; if less than 4.5 mm definitely shiny, not rugulose; antennal segment II clavate or cylindrical, more similar to segment III than I (Fig. 29)	25
25 (24)	Scutellum elongate, mid-laterally indented where clavus terminates, scutellum raised along mid-longitudinal "subridge" (Fig. 113) - (United States)	<i>A. inconstans</i> Uhler, p. 281
25'	Scutellum edge uniformly rounded or if sinuate indented anterior to termination of the clavus; central callosity may be present on scutellum, but not longitudinal "subridge" (Fig. 121)	26
26 (25)	Scutellum with mid-anterior callosity conspicuous (Fig. 121)	27
26'	Scutellum without mid-anterior callosity (Fig. 105)	29
27 (26)	Total body length of male 3.5 - 4.1 mm, female 3.7 - 4.9 mm - (Florida)	<i>A. politus</i> Say, p. 271
27'	Total body length of male 4.8 mm; female 5.0 mm or larger	28

- 28 (27) Integument dull, surface rugulose; scutellum short, round, length/width ratio of scutellum 1:1.9 (Fig. 130) - (Jamaica) *A. wygodzinskyi* n. sp., p. 271
- 28' Integument subshiny; scutellum more elongate, length/width ratio of scutellum 1:1.6 (Fig. 114) - (Mexico, Guatemala) *A. leptocerus* Hussey, p. 272
- 29 (26) Tylus extended to proximal end of antennal segment II (Fig. 49), northern distribution - (northern United States and Canada) *A. borealis* n. sp., p. 282
- 29' Head shorter, tylus not larger than antennal segment I (Fig. 59) 30
- 30 (29) Antennal segment I clearly longer than segment II (Fig. 33) - (Guatemala) *A. montanus* Champion, p. 285
- 30' Antennal segment I subequal to segment II (Fig. 41) 31
- 31 (30) Integument shiny, color orange-brown; scutellum inset, shorter, semicircular, length/width ratio of scutellum 1:1.9 (Fig. 126) - (Mexico, Nicaragua) *A. tenuis* Champion, p. 272
- 31' Integument not shiny, rugulose; color: head, pronotum and scutellum black, abdomen dark red-brown; scutellum not inset, more elongate, length/width ratio of scutellum 1:1.5 (Fig. 115) - (Mexico) *A. maryae* n. sp., p. 283

DESCRIPTIONS OF SPECIES

Aneurus dissimilis Bergroth

Aneurus dissimilis, Bergroth, 1889:3; 1914:106; Lethierry and Severin, 1896:46; Champion, 1898:116-7; Britton, 1923: 739; Usinger and Matsuda, 1959:100; Kormilev, 1968b:2.

Holotype. — ♀; Brazil (Botafogo: D van Volxem). (IRSB Mus.)

Comparisons. — *Aneurus dissimilis* specimens are readily distinguished from all other known *Aneurus* specimens by the triangular scutellum and well developed clavus.

Description. — ♂, Colombia: Sierra Nevada de Santa Marta: Cerro San Lorenzo, Pico Kennedy (AMNH). Color: head, pronotum and scutellum reddish-brown, abdomen slightly paler. Surface unevenly rugulose. Antennal segments I subobovate, II and IV fusiform, III terete; ratio of segments lengths 1:1.2:1.1:2.2 (Fig. 24). Head: length/width ratio 1:1.1; tylus length to distal third of antennal segment I; antenniferous tubercles and postocular tubercles absent (Fig. 52). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate; length/width ratio 1:1.9 (Fig. 80). Scutellum triangular, length/width ratio 1:1.2; scutellar surface rugulose but not distinct whorl pattern distinguishable (Fig. 108). Abdomen elongate, subovoid, width 2.4 mm, spiracles on abdominal segments II through VII lateral; connexival suture entire dorsally (Fig. 135), ventrally present as series of discontinuous parallel ridges terminated at caudal margin of sternite VI; fold on ventro-lateral edge of abdomen present from segments II to spiracle on sternum VII (Fig. 160). External genitalia: segment VIII subdeltoid; genital capsule large, slightly flattened dorso-ventrally, extended posteriorly more than twice length of segment VIII (Fig. 135). Total body length: 6.1 mm.

Variation. — Connexival suture of female sinuate posteriorly on tergum VII, sinuate around callosity on sternum VII to form a pseudosegment (Fig. 186, 212).

Geographical distribution. — southern Central America (Map 7), northern South America.

Relations. — *Aneurus dissimilis* shows slight relationship to *A. patriciae* by similarity in connexival suture patterns on the female abdomen, and both species show the same spiracle pattern.

Champion (1898) erected a new genus, *Aneurosoma*, on the basis of the triangular scutellum, for *A. dissimilis*. This name was synonymized with *Aneurus* by Usinger and Matsuda (1959). Kormilev (1968b) elevated *Aneurosoma* to subgeneric status. Aside from scutellar variation, *A. dissimilis* specimens show no greater structural variation from other American *Aneurus*

species. However, Štys (1974) accepted subgeneric status for this species. Judgments on status of subgenera of *Aneurus* should be withheld, until the genus can be phylogenetically reviewed on a world-wide basis.

Material examined. — 2♂, 2♀, same locality as described specimen.

Aneurus wygodzinskyi new species

Holotype. — ♀, Jamaica: “near Troy”, May 19, 1909, (Wright, AMNH).

Comparison. — Specimens are similar to those of *A. inconstans* in spiracle pattern but males have larger genital capsules, antennal segments II and III are subequal but larger than I, and the connexival sutures on segment VII are forked.

Description. — Color deep orange-brown. Surface finely rugulose. Antennal segment I roundly cylindrical, II and III terete, IV fusiform; ratio of segment lengths 1:2:2:3 (Fig. 45). Head length/width ratio 1:1.1; tylus extended to distal tip of antennal segment I; antenniferous tubercles short, rounded; postocular tubercles denticulate, extended to lateral margin of eyes (Fig. 73). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate; length/width ratio 1:2.2 (Fig. 101). Scutellum semicircular, length/width ratio: 1:1.8; scutellar whorl pattern central oblong callosity surrounded with concentric ridges parallel to lateral and posterior margins (Fig. 130). Abdomen subovoid; width 2.2 mm; spiracles II and VII lateral, III - VI ventral, equally distant from lateral edge, connexival suture forked on dorsal surface of segment VII (Fig. 155), ventrally suture present as series of broken ridges terminated at caudal margin of sternum VI, but present as indentation of caudal half of sternum VII; fold lateral to ventral sutures on sterna II through V (Fig. 180). External genitalia: segment VIII rectangular; genital capsule elongate, extended twice length of segment VIII (Fig. 155). Total body length: 4.75 mm.

Variation. — females are generally larger (5.5 mm - 5.0 mm), with connexival suture forked ventrally as well as dorsally, and fold lateral to ventral spiracles present from sternites III - VI, (Fig. 206, 232).

Type material. — Paratypes: Jamaica: “near Troy”, May 19, 1909, 1♂, 1♀, (Wright, AMNH).

Derivation of specific epithet. — This species is named in honor of Dr. Pedro Wygodzinsky in recognition of his excellent work with Hemiptera and his invaluable friendship to the author.

Geographic distribution. — Jamaica (Map 8).

Relations. — This species is related to *A. politus* as indicated by the presence of forked connexival suture on segment VII on both dorsal and ventral surfaces of the female abdomen, as well as similarities in external ♂ genitalia.

Aneurus politus Say

Aneurus politus Say, 1832:31; Uhler, 1871:106, 1878:421; Stål, 1873:146; Bergroth, 1892:337; Lethierry and Severin, 1896:46, nec. Champion, 1898:115; Barber, 1914:517; Blatchley, 1926:328; Usingeri and Matsuda, 1959:100; Kormilev, 1968b:8-9 (designates neotype).

Neotype. — ♂, Florida: Biscayne, 21.V.1887, ex Uhler coll. (USMN type No. 69798).

Comparison. — Specimens resemble those of *A. inconstans* in spiracle pattern, but are distinguished by poorly developed antenniferous and postocular tubercles as well as larger male genital capsule.

Description. — ♂, Alabama: Spring Hill (CAS). Color yellow-brown. Surface finely rugulose. Antennal segment I subovate, II and III clavate, IV fusiform; ratio of segment lengths 1:1.5:1.9:3 (Fig. 37). Head length/width ratio 1.1; tylus length to basal end of antennal segment II, antenniferous tubercles poorly developed, postocular tubercles not extended to lateral margins of eyes (Fig. 65). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate; length/width ratio 1:2.2 (Fig. 93). Scutellum semicircular, insert, length/width ratio 1:1.8; scutellar whorl pattern a midlongitudinal elliptic callosity surrounded by concentric ridges parallel to posterior and lateral scutellar margins (Fig. 121). Abdomen subovate, width 1.6 mm, spiracles II and VII lateral, III through VI ventral and distantly placed from lateral margin, connexival suture forked on tergum VII (Fig. 147), suture present as faint series of ridges terminated at caudal margin of sternum VI, fold lateral to ventral spiracles present on sternites III through VI (Fig. 172). External genitalia: segment VIII rectangular, genital capsule slightly longer than segments VIII (Fig. 147). Total body length: 3.8 mm.

Variation. — Females generally larger than males. Female connexival suture forked on both dorsal and ventral surfaces of segment VII (Fig. 198, 224).

Geographic distribution. — southern United States (Map 40). *Aneurus politus* has been overextended in the literature to cover several Central American species as well as its true southern U.S. populations. Kormilev (1968b) reviewed this problem, redefined the species and selected a neotype from Florida.

Relations. — This species is related to *A. wygodzinskyi* as indicated by specimens of both species having forked connexival suture conditions on abdominal segment VII both dorsally and ventrally.

Material examined. — 14♂, 13♀. FLORIDA - Dade County: Biscayne, (NMNH [neotype ♀], (NMNH). Pinella County: Belleair, (AMNH); Dunedin, (Blatchley, CAS), (Blatchley, CAS), (Blatchley, AMNH), (Blatchley, AMNH), (Blatchley, INHS), (Blatchley, CINC), (Blatchley, NMNH), (Blatchley, NMNH). Hernando County: Brooksville, from pine logs, (Van Dyke, CAS). St. John County: (Knight, NMNH). Hardee County: (Kelly, NMNH) "Florida", (NMNH). GEORGIA - Mitchell County: DeWitt, (Spoooner, CAS). ALABAMA - Barbour or Pike County?: Spring Hill, (Löding, CAS), (Löding, FMNH). MISSISSIPPI - spec. sur. No. 22124, on *Quercus prinoides* (NMNH). Range of dates of collection: November - March.

Aneurus tenuis Champion

Aneurus tenuis Champion, 1898:115; Usinger and Matsuda, 1959:100; Kormilev, 1968b:3.

Holotype. — ♂, Panama: Volcán de Chiriqui, 3,000', (Champion, BM).

Comparison. — Specimens are similar to those of *A. politus* in having the same spiracle pattern, similar scutellar, pronotal and head tubercles shapes, but *A. tenuis* specimens are much smaller.

Description. — ♂, Mexico: Guerrero: 3 mi. south of Achiuzolta (CAS). Color orange-brown. Surface polished, shiny. Antennal segment I obovate, II and III terete, IV fusiform; ratio of segment lengths: 1:1.4:1.7:3 (Fig. 41). Head length/width: 1:1.2; tylus not extended to distal end of antennal segment I; antenniferous tubercles well developed, extended beyond lateral margins of eyes (Fig. 69). Pronotum subtrapezoidal, wider posteriorly; lateral margins sinuate, subventral projections visible dorsally at mid-lateral margins; length/width ratio 1:1.6 (Fig. 97). Scutellum semicircular, inset; length/width ratio 1:1.8; scutellar whorl pattern a set of medial longitudinal lines surrounded by concentric ridges parallel to lateral and posterior margins (Fig. 126). Abdomen subovoid; width 1.9 mm; spiracles II and VII lateral, III through VI ventral, equally distant from lateral margins; connexival suture present only on dorsal surface, forked on tergum VII (Fig. 151); fold lateral to ventral spiracles present to caudal margin of sternum VI (Fig. 176). External genitalia: segment VIII cylindrical; genital capsule slightly longer than segment VIII (Fig. 151). Total body length: 4.3 mm.

Variation. — Specimens examined were generally larger than described by Kormilev, 1968b (4.9-4.3 mm, n=7). Females showed forked connexival suture on segment VII dorsally; ventrally connexival suture present only on segment VII. Sterna VI-VII partially fused (Fig. 203, 229).

Geographic distribution. — Central America (Map 9).

Relations. — This species is related to *A. tenuicornis* as indicated by the partial fusion of sterna VI and VII on females of both species.

Material examined. — 4♂, 4♀. MEXICO - Guerrero: 3 miles south of Acahuizolta, November 17, 1946, (Ross, CAS). NICARAGUA - Rivas: Isla de Ometepé, (Shimek, CAS).

Aneurus leptocerus Hussey

Aneurus tenuicornis Champion, 1898:116 (preoccupied), Van Duzee, 1917:182; Blatchley, 1926:329.

Aneurus leptocerus Hussey, 1957:80 (new name); Usinger and Matsuda, 1959:100; Kormilev, 1968b:3.

Holotype. — ♂, Guatemala: Capetillo, (Champion, BMNH).

Comparison. — Specimens are similar to those of *A. inconstans* in spiracle pattern, but can easily be distinguished by the polished surface, large genital capsule and forked condition of the connexival suture on the dorsal surface in both sexes.

Description. — Color deep orange-brown. Surface moderately polished, shiny. Antennal segment I roundly cylindrical, II and III terete, IV fusiform; ratio of segment lengths 1:1.7:2.2:2.8 (Fig. 30). Head: length/width ratio 1:1, tylus length to apical end of antennal segment I; antenniferous tubercles rounded, short, not to base of antennal segment I; postocular tubercles short, just extended to lateral margins of eyes (Fig. 58). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate; length/width ratio: 1:2.3 (Fig. 86). Scutellum semicircular, length/width ratio: 1:1.8; scutellar whorl pattern a mid-anterior elliptic callosity surrounded by concentric ridges parallel to posterior and lateral margins (Fig. 114). Abdomen

subovoid; width 2.1 mm; spiracles II and VII lateral, III through VI ventral and equally distant from lateral margins; connexival suture forked on tergite VII (Fig. 140), ventrally connexival suture present as faint series of ridges terminated at caudal margin of sternum VI; fold lateral to ventral spiracles present on sternum III to spiracle on sternum VI (Fig. 165). External genitalia: segment VIII rectangular; genital capsule elongate, extended beyond segment VIII posteriorly (Fig. 140). Total body length: 4.9 mm.

Variation. — Females generally larger, connexival suture forked on dorsal surface of segment VII, sterna VI and VII seem partially fused, with connexival suture present in forked condition on sternum VII (Fig. 192, 218).

Geographic distribution. — Central America (Map 7).

Relations. — This species shows relationship to *A. tenuis* as indicated by the shared condition of partial fusion of sterna VI and VII on the female abdomen.

Material examined. — 4♂, 4♀. GUATEMALA - Sacatepéquez: Capetillo, (Champion, NMNH) (paratypes); (Champion, BM); Baja Verapaz: Purulhá. (Champion, BM). MEXICO - Chiapas: 30 miles south of Tuxtla, on route 190, 1,148 km south of Mexico City, 9,500', August 10, 1962, (Milliron, CNC).

Aneurus hispaniolensis new species

Holotype. — ♀, Haiti: Roche Croix Mountains, October 13, 1934, 5,000', (AMNH) (The holotype has in indentation of the third abdominal segment on its left side.)

Comparison. — Specimens are similar to those of *Aneurus haitiensis* but are distinguished by lighter color of body anteriorly and by differences in scutellar whorl pattern, as illustrated.

Description. — Color: head, pronotum and scutellum yellow-brown. Surface mildly rugulose. Antennal segment I subobovate, II and IV fusiform, III terete; ratio of segment lengths, 1:1:1:2.5 (Fig. 28). Head length/width ratio, 1:1.1; tylus length almost to distal end of antennal segment I; antenniferous tubercles poorly developed, short, rounded; postocular tubercles short, length not to lateral margins of eyes (Fig. 56). Pronotum subtrapezoidal, wider posteriorly, all four margins deeply sinuate; length/width ratio 1:1.6 (Fig. 84). Scutellum subtriangular, anterior margin mildly sinuate, apex rounded posteriorly; length/width ratio 1:1.4; scutellar whorl pattern a series of anterior longitudinal ridges divergent posteriorly, surrounded by concentric ridges parallel to lateral and posterior margins, antero-lateral ridges present (Fig. 112). Abdomen subovoid, width 2.1 mm; abdominal spiracles II, VI, VII lateral, III, IV, and V ventral but very near lateral margin of abdomen; connexival suture sinuate posteriorly on tergum VII (Fig. 190), connexival suture on sterna III through VI as faint series of ridges; sinuate around callosity on sternum VII as pseudosuture; fold lateral to ventral spiracles present, well developed on segments III through VI (Fig. 216). External genitalia: (Fig. 190). Total body length: 4.8 mm.

Variation. — Female specimen from the Dominican Republic may be conspecific, as it is identical in body proportions, differing only in its uniformly dark red-brown color and lesser length (3.8 mm). I have not seen males of this species.

Derivation of specific epithet. — This species is named to indicate its type locality: the lovely island of Hispaniola.

Geographic distribution. — Hispaniola (Map 8).

Relations. — *Aneurus hispaniolensis* is related to *A. vauriei* and *A. haitiensis* as indicated by pattern of the spiracles and connexival suture.

Material examined. — 1♀, Dominican Republic: La Vega Province: 14 km north of Jarabacoa, on road to La Vega, January 26, 1954, beating vegetation (E.L. Mockford, FSCG).

Aneurus haitiensis Kormilev

Aneurus haitiensis Kormilev, 1968a:6-7, 1968b:3.

Holotype. — ♂, Haiti: Morne Guimby, 22 km southeast of Fond Verrettes, 6,500', B. and B. Valentine, 20-VII-1956, USMN type No. 69614.

Comparison. — *Aneurus haitiensis* specimens have a forked connexival pattern similar to that of *A. vauriei*. Specimens of the former are much larger in body size.

Description. — ♂, same data as holotype but deposited in OSU. Body reddish-brown with dark brown wings. Surface rugulose. Antennal segment I subobovate, II terete, III subcylindrical, IV fusiform; ratio of segment lengths 1:1:1.3:2.5 (Fig. 27). Head: length/width ratio 1:1.1; tylus length to distal end of antennal segment I; antenniferous tubercles absent;

postocular tubercles poorly developed, length not to outer margins of the eyes (Fig. 55). Pronotum subtrapezoidal, wider posteriorly, all four margins strongly sinuate with ventral medio-lateral projections to lateral margins of the pronotum; length/width ratio 1:2.2 (Fig. 83). Scutellum subtriangular, apex rounded posteriorly; length/width ratio 1:1.4, scutellar whorl pattern a series of broken concentric ridges parallel to posterior and lateral margins of the scutellum around series of longitudinal ridges at mid-anterior margin; antero-lateral ridges absent (Fig. 111). Abdomen subovate; width 2.2 mm; abdominal spiracle pattern II, VI and VII lateral, III, IV, and V on ventral fold; connexival suture entire dorsally (Fig. 138), no pseudosegment on either dorsal or ventral surface; connexival suture a series of parallel ridges on each sternum terminated at caudal margin of sternum VI; ventral fold well developed from sternum II to anterior of sternum VII (Fig. 163). External genitalia: segment VIII subrectangular; genital capsule, short, rounded, equal in length to segment VIII (Fig. 138). Total body length 4.7 mm.

Variation. — Female allotype has entire connexival suture on dorsal surface; connexival suture encircles callosity on sternum VII (Fig. 189, 215).

Geographic distribution. — Haiti (Map 8).

Relations. — *Aneurus haitiensis* is closely related to *A. vauriei* by virtue of the similarity in the forked connexival suture pattern.

Material examined. — Allotype (OSU) and paratype (OSU) from same locality as described specimen.

Aneurus vauriei Kormilev

Aneurus vauriei Kormilev, 1964:156-7, 1968b:2.

Comparison. — Specimens of this species are similar to those of *A. hispaniolensis* in their abdominal suture patterns. *A. vauriei* is distinguished from *A. hispaniolensis* by significantly smaller size, with postocular tubercles extended laterally to at least the outer margin of eyes.

Holotype. — ♂, Guadeloupe: Deshaies, June 28, 1960, (Vauries, AMNH).

Description. — Color uniformly orange-brown. Surface mildly rugulose. Antennal segment I obovate, II subobovate, III cylindrical, IV fusiform; ratio of segment lengths 1:1:1.3 (Fig. 43). Head length/width ratio 1:1.1; tylus extended to base of antennal segment II; antenniferous tubercles short, just to base of antennal segment I; postocular tubercles well developed, extended beyond lateral margin of eyes (Fig. 71). Pronotum subtrapezoidal, wider posteriorly, all four margins sinuate; length/width ratio 1:2 (Fig. 99). Scutellum subtriangular; length/width ratio 1:1.4; scutellar whorl pattern a set of anterior longitudinal ridges surrounded by concentric ridges parallel to lateral and posterior margins (Fig. 128). Abdomen subovoid, width 1.12 mm; spiracles II, VI, VII lateral, III, IV, V ventral sub-equally distant from lateral edge; connexival suture entire dorsally (Fig. 153), ventrally connexival suture present only as faint series of ridges medial to spiracles terminated at caudal margin of sternum VI, sub-lateral fold well developed through anterior of abdominal segment VI (Fig. 178). External genitalia: segment VIII deltoid; genital capsule large, extended twice the length of segment VIII (Fig. 153). Total body length: 2.8 mm.

Variation. — The connexival suture of the female is forked on abdominal segment VII dorsally and sinuate around a callosity on both ventral and dorsal surfaces to form a pseudosegment on segment VII (Fig. 205, 231).

Geographic distribution. — Caribbean (Map 8).

Relations. — *A. vauriei* was described from a mixed type series, and the published description is not in agreement with features of the holotype. This is a redescription of *A. vauriei* based on the holotype as designated by Kormilev 1968b. Two paratypes which belong to another species are described under the name *A. patriciae*. *A. vauriei* is related to *A. deborahae* as indicated by the forked connexival suture on abdominal segment VII, and the sinuate suture on sternite VII of the females of both species.

Material examined. — 1♀, Guadeloupe - Deshaies, June 28, 1960, (Vauries, AMNH), (allotype).

Aneurus deborahae new species

Holotype. — ♀, California: Santa Barbara County: Gaviota Pass, June 20, 1949, (Coth, CINC).

Comparisons. — *Aneurus deborahae* and *A. minutus* specimens share a similar spiracle pattern but specimens of *A. deborahae* can be distinguished by the rounded abdomen and well developed antenniferous tubercles, combined with poorly developed postocular tubercles and by elongate second antennal segments.

Description. — Color uniformly dark orange-brown. Surface rugulose. Antennal segment I subobovate, II and IV fusiform, III subcylindrical, ratio of segment lengths: 1:1.1:3:2.3 (Fig. 23). Head: length/width ratio 1:1.2; tylus short length to distal end of antennal segment I; antenniferous tubercles serrate laterally, length to base of antennal segment I; postocular tubercles denticulate laterally, poorly developed, lateral margin of eyes not reached (Fig. 51). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate, serrate; length/width ratio 1:2.2 Fig. 79. Scutellum short, sinuate laterally, rounded posteriorly; length/width ratio 1:1.4; scutellar whorl pattern a series of concentric ridges parallel to lateral and posterior margins; anterolateral ridges present (Fig. 107). Abdomen subovate, width 2.0 mm, spiracles II, VI and VII lateral, III, IV and V ventral, equally distant from lateral edge, connexival suture forked on surface of tergum VII (Fig. 185), on sternum VII callosity surrounded by sinuate suture to form a pseudosegment; fold lateral to ventral spiracles faintly present to caudal margin of sternum VI (Fig. 211). External genitalia: as in Fig. 185. Total body length: 4.3 1/2 mm.

Variation. — I have not seen any males of this species.

Type material. — Paratypes, 2♀. CALIFORNIA - Santa Barbara County: Gaviota Pass, June 20, 1949, (Coth, CINC).

Derivation of specific epithet. — This species is named for Ms. Deborah Berry, American Museum of Natural History, in recognition of her friendship to the author.

Geographic distribution. — southern California (Map 4).

Relations. — *Aneurus deborahae* shows relationship to *A. vauriei* as indicated by the similar forked condition of the connexival suture on tergum VII and the sinuate connexival suture on sternum VII.

Aneurus pygmaeus Kormilev

Aneurus pygmaeus Kormilev, 1966:6-7, 1968b:3.

Holotype. — ♂, Texas: Aransas Co., March 31, 1954, D.J. and J.N. Knull collectors, ex J.L. Lutz collection, USMN type No. 67583.

Comparison and Relations. — Members of this species and of *A. minutus* are extremely similar morphologically to one another (see description of this latter species for details and discussion). The holotype of *A. pygmaeus* differs from the type of *A. minutus* primarily in color pattern: body of *A. pygmaeus* dark red-brown with white wing membrane; body of *A. minutus* orange-brown with dark brown wing membrane. All other morphological characters, overlap, showing no more variation between the two species than between individuals of either species, as exemplified by body length measurements (Fig. 233).

Geographic distribution. — southern United States (Map 5).

Material examined. — 1♂, 21♀. GEORGIA - Macon County: beaten from oak (Hussey, FSCG). Baker County: on oak (Hussey, FSCG). FLORIDA - Highlands County: Archbold Biological Station, Lake Placid (Nadler, AMNH). Broward County: 2 miles southwest of Hallandale, dead *Quercus virginiana*, (Weems, FSCG); Pinellas County: Dunedin (Blatchley, CINC), (Blatchley, CINC), (Blatchley, BMNH); Marion County: Ocala National Forest (Knull, CINC); Walton County: De Funiak Springs, beating oak (Howden, CNC). TEXAS - Aransas County (allotype) (NMNH); Brazos County (Burke, TAM); Refugio County: 19 miles north of Tivoli taken on cactus (Michener, Beamers, Wille and La Berge, UKL). CALIFORNIA: Los Angeles County: Tanbark Flat, (McClay, CINC). Range of dates of collection: November to June.

Aneurus minutus Bergroth

Aneurus minutus Bergroth, 1886:58, 1892:337; Lethierry and Severin, 1896:46; Champion, 1898:114-115; Van Duzee, 1917:142; Blatchley, 1926:330; Usinger and Matsuda, 1959:100; Kormilev, 1968b:3.

Holotype. — ♀, "Texas", (NHRS).

Comparison. — Members of this species are similar to those of *A. veracruzensis* and *A. arizonensis* but differ by more elongate second antennal segments and wider heads as reflected in head length/width ratio.

Description. — Body uniformly orange-brown, wing membrane dark brown. Surface rugulose. Antennal segment I obovate, II subobovate, III cylindrical, IV fusiform; ratio of segment lengths 1.3:1:1.3:3 (Fig. 32). Head length/width ratio 1:1.2; tylus length only to distal end of antennal segment I; antenniferous tubercles moderately developed, length to base of antennal segment I; postocular tubercles short, not extended to lateral margin of eyes (Fig. 60). Pronotum subtrapezoidal,

wider posteriorly all four margins sinuate; length/width ratio 1:2.2 (Fig. 88). Scutellum subtriangular; length/width ratio 1:1.3; scutellar whorl pattern a series of mid-anterior ridges around an oval shaped callosity, surrounded by concentric circles parallel to lateral and posterior margins (Fig. 116). Abdomen subovoid, lateral edges serrate; width 1.5 mm; spiracle pattern II, VI, VII lateral, III, IV, V ventral and equidistant from lateral margin; connexival suture entire dorsally (Fig. 194), ventrally present as a series of broken ridges to caudal margin of sternite VI, on sternite VII suture around callosity; fold lateral to ventral spiracles well developed to mid-length of sterna VII (Fig. 220). External genitalia: (Fig. 194). Total body length: 3.6 mm.

Variation. — Males are proportionally smaller, abdominal segment VII deltoid, genital capsule short, rounded, attaining only half the length of segment VIII (Fig. 142, 167). Some females show more defined connexival sutures; sinuate on tergite VII, sinuate around callosity of sternum VII to form pseudosegment.

I have found *A. minutus* and *A. pygmaeus* to be extremely similar structurally, differing significantly only in color. Since species of *Aneurus* are fairly uniform in color this may be a significant difference. There are a few individuals from Florida and Texas where coloration patterns also are mixtures of the two species; that is light brown bodies with white wings or dark bodies with dark wings. It seems *A. minutus* and *A. pygmaeus* might be conspecific, but if so the name *A. pygmaeus* should have varietal status; however, due to the lack of data on other aspects of these animals, i.e., ecological, habitat and physiology that would answer if and/or why two morphs are being supported in individual populations. Study of more material from critical intermediate sites in southern United States are critical for a decision on synonymy that is not appropriate at this time. A comparison between populations of *A. pygmaeus* and *A. minutus* showing overlap in total body length is illustrated in Fig. 233.

Geographic distribution. — southern United States (Map 5).

Relations. — This species is related to *A. patriciae* as indicated by the similar connexival suture pattern on abdominal segment VII on the males of both species.

Material examined. — 43♂, 60♀. GEORGIA - Baker County: on oak (Hussey, FSCG). FLORIDA - Marion County: Ocala National Forest (Knull, CINC). Volusia County: Edgewater (Frost, NMNH). Broward County: 2 miles southwest of Hallandale under dead bark of *Quercus virginiana* (Weems, FSCG). Lafayette County, on Sabal palmetto, (Habeck, FSCG). Pinellas County: Dunedin (Blatchley, NMNH), (Blatchley, CINC), (Blatchley, BMNH), (Blatchley, INHS), (Blatchley, FMNH). ARIZONA - Santa Cruz County: Patagonia, ex. mesquite, (Martin, CAS); Santa Rita Mountains, (Knull, CINC). Pima County: Tucson (Knull, CINC). Gila County: Globe, (Duncan, AMNH). Pinal County: Superstition Mountains, Lackberry bark (Duncan, AMNH). TEXAS - Uvalde County: Uvalde, (Knull, CAS), (Knull, CINC); Sabinal, (Pierce and Pratt, NMNH); Uvalde County (Knull, CINC), Travis County: Austin, (CAS). Brazos County: College Station under bark of redbud tree (Wellso, TAM), (Reinhard, TAM). Kerr County: Kerrville, (Becker and Howden, CNC), (Pratt, NMNH), Val Verde County, (Knull, NMNH). Gillespie County: (Knull, CINC). Range of dates of collection: November to July.

Aneurus patriciae new species

Holotype. — ♂, Jamaica: Hardwar Gap, 4,000', VII.8.1966, Howden and Becker, (CNC).

Comparison. — The spiracle pattern of *A. patriciae* members is shared only with *A. dissimilis* members, those of *A. patriciae* are much smaller, with rounded scutellae.

Description. — Body orange-brown, wing membrane darker brown. Surface slightly rugulose, subshiny. Antennal segment I obovate, II and IV fusiform, III cylindrical; ratio of segment lengths 1.2:1.2; 1:2.7 (Fig. 36). Head length/width ratio 1:1.1; tylus long, length to base of antennal segment II; antenniferous tubercles short, length just to base of antennal segment I; postocular tubercles short, length just to lateral margins of eyes (Fig. 64). Pronotum subtrapezoidal, all four margins sinuate, mid-lateral subventral projections visible dorsally, length/width ratio: 1:2 (Fig. 92). Scutellum subtriangular, length/width ratio 1:1.4, scutellar whorl pattern: mid-anterior oval surrounded by concentric ridges parallel to lateral and posterior margins (Fig. 120). Abdomen subovoid, width 1.7 mm; spiracle pattern II through VII lateral, connexival suture entire dorsally (Fig. 146), present ventrally as series of faint ridges, on segment VII sinuate around a callosity, ventro-lateral fold present and well developed to caudal margin of sternite VI (Fig. 171). External genitalia: segment VII subrectangular, genital capsule large, rounded, extended at least twice length of segment VIII, (Fig. 146). Total body length: 3.9 mm.

Variation. — Females with connexival suture sinuate posteriorly on tergite VII, connexival suture sinuate around a callosity on sternite VII to form pseudosegment, (Fig. 197, 223).

Type material. — Paratypes: Jamaica: Hardwar Gap, July 8, 1966, 4,000', 10♂, 7♀, (Howden

and Becker) (CNC).

Derivation of specific epithet. — This species is named in honor of Patricia Vaurie of the Entomology Department, American Museum of Natural History.

Geographic distribution. — Caribbean (Map 8).

Relations. — This species may be closely related to *A. minutus* as it shares a similar reduction of the connexival suture pattern on the ♀ sternum.

Material examined. — CUBA - Santa Clara Province: Soledad, July 1-7, 1939, (C.T. Parson, AMNH); Buenos Aires: Trinidad Mountains, May 8-14, 1936, 2,500-3,500', (Darlington, AMNH).

Aneurus aibonitensis Kormilev

Aneurus aibonitensis Kormilev, 1968b: 4-5.

Holotype. — ♀, Puerto Rico, Aibonito BF, Medina coll., VI. 1961 (USNM type 69795).

Comparisons. — *Aneurus aibonitensis* members have an abdominal spiracle pattern similar to that of *A. pisoniae* members. However, those of *A. aibonitensis* are distinguished by the well developed, sinuate, connexival suture and callosity pattern on the ventral surface of abdominal segment VII.

Description. — ♂, Puerto Rico: Adjuntas; San Juan, May 3, 1934. Color dark red-brown. Surface rugulose. Antennal segment I obovate, II subobovate, III terete, IV fusiform; ratio of segment lengths 1:1:1:2.2 (Fig. 18). Head: length/width ratio 1:1.2, tylus short, length to distal end of antennal segment I, antenniferous tubercles acute, short, to base of antennal segment I: postocular tubercles well developed, extended beyond lateral margins of eyes (Fig. 46). Pronotum subtrapezoidal, wider posteriorly, all four margins sinuate; length/width ratio: 1:2 (Fig. 74). Scutellum subtriangular, apex rounded posteriorly; length/width ratio 1:1.4; scutellar whorl pattern a series of mid-anterior oval callosity ridges surrounded by concentric ridges parallel to posterior and lateral margins; anterolateral ridges present (Fig. 102). Abdomen elongate, subovate; width 1.4 mm; abdominal spiracle pattern: II, V through VII lateral, III and IV ventral but both near lateral margin; connexival suture entire on dorsal surface (Fig. 131), ventrally connexival suture present as a series of broken parallel ridges medial to ventral spiracles, suture strongly indented on sternum VII; ventral fold lateral to ventral spiracles present and well developed to caudal margin of segment VI (Fig. 156). External genitalia: segment VIII rectangular, genital capsule short, rounded, length to dorsal end of segment VIII (Fig. 131). Total body length: 3.6 mm.

Variation. — I have not seen females of this species.

Habitat. — Collected from decaying wood.

Geographical distribution. — Puerto Rico (Map 8).

Relations. — Until ♀ specimens of this species have been examined its relationship to other *Aneurus* species is unclear. However, *A. aibonitensis* may be related to *A. neojamaicensis* on the basis of similar spiracle pattern and geographic proximity.

Material examined. — 3♂. PUERTO RICO - Adjuntas: San Juan, May 3, 1934, (NMNH).

Aneurus neojamaicensis new species

Holotype. — ♂, Jamaica: Barbecue Bottom, VIII.12.66; H.F. Howden (CNC).

Comparison. — This species is similar to *A. pusillus* in shape of scutellum and male genital capsule, but can be distinguished by its much rounder abdomen.

Description. — Color uniform, light yellow-brown. Surface mildly rugulose. Antennal segment I obovate, II subovate, III terete, IV fusiform; ratio of segment lengths 1:1:1:2.8 (Fig. 35). Head: length/width ratio 1:1.1; tylus length to base of antennal segment II, antenniferous tubercles short, rounded laterally, postocular tubercles well developed, extended to lateral margin of eyes (Fig. 63). Pronotum subtrapezoidal, wider posteriorly, all four margins sinuate; length/width ratio 1:2.5 (Fig. 91). Scutellum subtriangular; length/width ratio 1:1.2; scutellar whorl pattern: mid-anterior rugosity random, surrounded posteriorly by concentric ridges parallel to lateral and posterior margins of scutellum (Fig. 119). Abdomen elongate, sides subparallel lateral margins minutely serrate; width 1.2 mm; spiracle pattern II, V, VI, VII lateral, III and IV ventral with III more distant from lateral margin than IV; connexival suture complete dorsally (Fig. 145), ventrally, connexival suture present as faint series of ridges terminated at caudal margin of sternum VI; ventral fold lateral of ventral spiracles present to caudal margin of sternum VI (Fig. 170). External genitalia: segment VIII rectangular, short; genital capsule large extended posteriorly twice length of segment VIII, rounded posteriorly, slightly flattened dorsoventrally (Fig. 145). Total body length: 3.1 mm.

Variation. — Females slightly larger: 4.1 mm, color more red-brown; connexival suture sinuate posteriorly on tergum VII, sinuate around callosity on sternum VII to form pseudosuture, (Fig. 196, 222).

Type material. — paratypes: Jamaica: Barbecue Bottom, August 12, 1966, 1♀, (Howden, CNC), August 6, 1966, 1♀, (Howden, CNC).

Derivation of specific epithet. — This species is named for its type locality, Jamaica.

Geographic distribution. — Jamaica (Map 8).

Relations. — This species is related to *A. championi* as indicated by the similar connexival suture pattern on female abdominal segment VII of both species and the lack of sutures on sternum VII in males of both species.

Aneurus championi Kormilev

Aneurus politus Champion, 1898:115; nec Say, 1831:31.

Aneurus championi Kormilev, 1968b:2-10.

Holotype. — ♀, Guatemala: Chicacao; E.J. Hambleton coll., 7.VII.1945. USNM type 69799.

Comparisons. — Specimens of this species are similar to those of *A. minutus* in the spiracle pattern, but differ by the well developed postocular tubercles and dorsally visible subventral projections at the midlateral margins of the pronotum of *A. championi* members.

Description. — ♂, Guatemala: Capetillo. Color orange-brown. Surface shiny, mildly rugulose. Antennal segment I obovate, II clavate, III terete, IV fusiform, ratio of segment lengths 1:1:1:2.3 (Fig. 22). Head: length/width ratio 1:1.2; tylus thin, short, distal tip of antennal segment I not attained; antenniferous tubercles rounded, poorly developed; postocular tubercles well developed, extended beyond lateral margins of eyes (Fig. 50). Pronotum subtrapezoidal, wider posteriorly, all four margins strongly sinuate; subventral projections visible dorsally at midlateral pronotal margins; length/width ratio 1:2 (Fig. 78). Scutellum subtriangular; length/width ratio 1:1.7; scutellar whorl pattern a mid-anterior elliptic callosity surrounded by concentric ridges paralleling posterior and lateral margins of scutellum (Fig. 106). Abdomen subovoid; width 2.1 mm; spiracles II, VI, VII lateral, III, IV, V ventral, equally distant from lateral edge; connexival suture entire dorsally (Fig. 134), present as faint ridge ventrally terminated at caudal margin of sternum VI; fold lateral to ventral spiracles present but terminated at mid-length of sternum VI (Fig. 159). External genitalia: segment VIII subcylindrical; genital capsule rounded, short to distal end of segment VIII (Fig. 134). Total body length 4.6 mm.

Variation. — Female slightly larger than male, connexival suture on the female abdomen sinuate posteriorly on tergum VII, ventrally extended to sternite VII where callosity is surrounded and pseudosegment created; fold lateral to ventral spiracles extended posteriorly to spiracle VII (Fig. 184, 210).

Geographical distribution. — southern Central America (Map 6).

Relations. — *Aneurus championi* is most closely related to *A. neojamaicensis* as indicated by similarity in connexival suture pattern on abdominal segment VII of the females of both species.

Material examined. — 1♂, 1♀ GUATEMALA - Sacatepéquez: Capetillo (Champion, BM).

Aneurus simplex Uhler

Aneurus simplex Uhler, 1871:106, 1878:421; Stål, 1873:146; Bergroth, 1892:337; Lethierry and Severin, 1896:47; Heidemann, 1904:164; Van Duzee, 1917:141; Britton, 1923:329; Usinger and Matsuda, 1959:100; Kormilev, 1968b:2.

New Synonymy. — *Aneurus septentrionalis* Walker, 1873:30; Bergroth, 1892:337; Lethierry and Severin, 1896:46; Van Duzee, 1917:141; Blatchley, 1926:330; Usinger and Matsuda, 1959:100; Kormilev, 1968b:2.

Holotype. — "New England", (CAS).

Comparison. — Males of this species can be easily separated from all other *Aneurus* males and treated in this revision by the posterior protuberance on the genital capsule.

Description. — ♂, "Vermont" (AMNH). Color yellow-brown. Surface moderately polished, sub-shiny. Antennal segment I obovate, II clavate, III terete, IV narrowly fusiform; ratio of segment length 1:1.2:1.5:3 (Fig. 39). Head length/

width ratio 1:1.1; tylus length to proximal third of antennal segment II; antenniferous tubercles short, not extended to base of antennal segment I; postocular tubercles well developed, extended beyond lateral margin of eyes (Fig. 67). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate, length/width ratio 1:2 (Fig. 95). Scutellum short semicircular, length/width ratio 1:1.5; scutellar whorl pattern a set of anterior longitudinal ridges surrounded by concentric ridges posteriorly and laterally, antero-lateral ridges absent (Fig. 124). Abdomen subovoid, width 1.9 mm; abdominal spiracle pattern II, V through VII lateral, visible dorsally, III and IV ventral, equally distant from lateral edge, connexival suture entire dorsally (Fig. 149); ventrally connexival suture present only as faint series of parallel broken ridges terminated at posterior margin of sternite VI; fold lateral to ventral spiracles faintly present on segments II through V (Fig. 174). External genitalia: segment VIII short, rectangular, spiracles terminal; genital capsule short, rounded, wider than long with slight rounded terminal protuberance, capsule not extended to distal end of segment VIII (Fig. 149). Total body length: 4.8 mm.

Variation. — Females generally longer, 4.9 - 5.4 mm, with connexival suture entire dorsally, forked on sternum VII to form a pseudosegment (Fig. 201, 227).

Geographic distribution. — This species follows the boreal zone from northern New York west across Canada, south through Colorado and north to Alaska (Map 1).

Relations. — This species is related to *A. roseae* as indicated by the sinuate condition of the female sternite VII and lack of connexival suture from the male sternite VII.

Material examined. — 18♂, 39♀. CANADA. YUKON TERRITORY - Gravel Lake, 58 mi east of Dawson, 2,050' August 13, 1962, (Skitsko, CNC), NORTHWEST TERRITORIES - Aklavik (Bryant CNC), BRITISH COLUMBIA - Hazelton, (Barbeau, CAS); Kaslo, (Caudell, CAS); Cockle, (CNC), (Currie, NMNH); Bernon, (Hopping, CAS); Terrace, (Hippisley, CAS); Summit Lake, mile 392 on the Alaska Highway, 4,500' (Leech, CNC); (MacDougall, CNC); Lorna, on *Picea engelmanni*, (Hopping, CNC); Kicking Horse Camp, (Hopping, CNC); Kootenay National Park, 36 miles north of Radwin, on *Picea engelmanni* (O'Brien, OBTF). ALBERTA - Banff, (Bryant, CNC), MANITOBA - Gillam, (Brown, CNC), ONTARIO - Nipigon, 1♀, (CAS); Labrador: Goose Bay, (Beckel, CNC). UNITED STATES. ALASKA - 28 miles south of Delta Junction, September 3, 1956, on *Picea glauca*, (Downing, NMNH). WASHINGTON - Thurston County: Olympia (T. Kincaid, CAS). OREGON - Union County: North Powder Lakes, (Edmonton, NMNH). MONTANA - Mineral Co.: Saint Regis, (Waldorf, NMNH). COLORADO - Pingree Park (Beamer, UKL). NEW YORK - St. Lawrence County: Cranberry Lake (Hatch, FSCG). NEW HAMPSHIRE - Carroll County: Crawford, (Parshley, CAS). Coos County: White Mountains (Shartliff, AMNH). "Vermont", (Sprague, AMNH), (Henshae, AMNH). MAINE - Penobscot County: Wassataquoik River, (AMNH). "MASSACHUSETTS" - (Parshley, CAS). Range of dates of collection: June to September.

Aneurus roseae new species

Holotype. — ♂, Texas: Kerrville, April 24, 1953, on cedar chips on ground (Bottimer, CNC).

Comparison. — Specimens are similar in appearance to those of *A. minutus* and *A. arizonensis* but males of *A. roseae* are separated by the larger genital capsule.

Description. — Color uniformly yellow-brown. Surface rugulose. Antennal segment I obovate, II and IV fusiform, III cylindrical; ratio of segment lengths 1:1:1:2 (Fig. 38). Head length/width ratio 1:1.1; tylus length to apical end of antennal segment I; antenniferous tubercles small, acute; postocular tubercles short, denticulate, not extended to lateral margin of eyes (Fig. 66). Pronotum subtrapezoidal, wider posteriorly, all four margins sinuate, lateral margins serrate; length/width ratio 1:1.9 (Fig. 94). Scutellum subtriangular, length/width ratio 1:1.4; scutellar whorl pattern a series of mid-anterior ridges which form an oval surrounded by concentric ridges parallel to posterior and lateral margins, antero-lateral ridges present (Fig. 123). Abdomen elongate, lateral margins mildly serrate; width 1.6 mm, spiracles II, VI and VII lateral, III, IV, V ventral and equally distant from lateral edge, connexival suture entire dorsally (Fig. 148), ventrally present as faint series of parallel ridges terminated at caudal margin of sternite VI, no pseudosegments present; fold lateral to ventral spiracles terminated at caudal margin of sternite V (Fig. 173). External genitalia: segment VIII rectangular; genital capsule elongate, rounded posteriorly, extended posteriorly twice the length of segment VIII (Fig. 148). Total body length: 4.0 mm.

Variation. — Female larger (4.3 mm), with more developed postocular tubercles. Connexival suture present through sternum VII, forked on sternum VII to surround callosity to create a pseudosegment (Fig. 200, 226).

Type material. — Paratype. TEXAS - Big Bend National Park, Pulliam Canyon, 5,700', May 17, 1959, 1♀, (Howden and Becker, CNC).

Derivation of specific epithet. — This species is named in honor of Rose Adlington (American Museum of Natural History) representing all scientific technicians in recognition for their important supportive roles in systematics research.

Geographic distribution. — Texas (Map 4)

Relations. — This species is related to *A. simplex* as indicated by the similar sinuate connexival suture condition on the female sternum VII.

Aneurus froeschneri Kormilev

Aneurus froeschneri Kormilev, 1968b:7.

Holotype. — ♀, Panama: El Valle, N.L.H. Krauss coll. XI-1946, USNM type No. 69797.

Comparison. — Specimens are similar to those of *A. minutus* in spiracle pattern but are distinguished by the more elongate abdomen, and posteriorly narrowing scutellum. In *A. minutus* specimens scutella are evenly rounded.

Description. — ♂, Mexico: Orizaba: Vero Cruz, (AMNH). Color uniformly dark orange-brown. Surface finely rugulose. Antennal segment I obovate, II subobovate, III and IV terete; ratio of segment lengths 1.2:1.2:1:1.4:2.7 (Fig. 26). Head: length/width ratio 1:1.1; tylus length to distal end of antennal segment I; antenniferous tubercles well developed, length to base of antennal segment I; postocular tubercles well developed, extended to lateral margins of eyes (Fig. 54). Pronotum subtrapezoidal, wider posteriorly, lateral margins strongly sinuate, length/width ratio 1/1.9 (Fig. 82). Scutellum subtriangular; length 1:1.2; scutellar whorl pattern a mid-anterior oval callosity surrounded by concentric ridges parallel to posterior and lateral margins (Fig. 110). Abdomen elongate, spiracles II, VI and VII lateral, III, IV, V ventral and equally distant from lateral margin; connexival suture entire dorsally (Fig. 137), ventrally present as faint series of ridges terminated at caudal margin of sternum VI, fold lateral to ventral spiracles present from sternum III through VI (Fig. 162). External genitalia: segment VIII deltoïd; genital capsule short, rounded, not as long posteriorly as segment VIII (Fig. 137). Total body length: 3.85 mm.

Variation. — Females with connexival suture sinuate posteriorly on tergite VII, extremely faint connexival suture markings obvious only on sternum VII where it is formed to surround callosity (Fig. 188, 214).

Geographical distribution. — Central America (Map 6).

Relations. — This species may be closely related to *A. arizonensis* as females share similar reductions in the connexival suture pattern of the sternum.

Material examined. — 10♂, 5♀. MEXICO and VERA CRUZ: Orizaba (Mann, AMNH); same locality, data (CINC).

Aneurus arizonensis new species

Holotype. — ♂, Arizona: Chirihua Mountains, September 14, 1938, (Knull, CINC).

Comparisons. — This species is related to *A. fiskei* and *A. inconstans* as indicated by the sinuate connexival suture on sternite VII, but is distinguished from these latter species by a narrower body and more developed antenniferous and postocular tubercles.

Description. — Color dark red-brown with darker brown wings. Surface rugulose. Antennal segment I obovate, II subobovate, III cylindrical, IV fusiform; ratio of lengths 1.4:1:1.4:3 (Fig. 19). Head: length/width ratio 1:1.1; tylus extended to base of antennal segment II; antenniferous tubercles well developed, acute, extended beyond base of antennal segment I; postocular tubercles well developed, extended beyond lateral margin of eyes (Fig. 47). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate, length/width ratio 1:2 (Fig. 75). Scutellum semicircular, length/width ratio 1:1.5; scutellar whorl pattern a mid-anterior longitudinal oval surrounded by concentric ridges parallel to lateral and posterior margins, anterolateral ridges present, scutellum with squared appearance instead of actual subtriangular shape (Fig. 103). Abdomen subovate, width 1.7 mm; spiracles II, VI, VII lateral, III, IV, V ventral and equally distant from lateral margin; connexival suture entire dorsally, no pseudosegment present either dorsally (Fig. 132) or ventrally; ventrally connexival suture present as a series of parallel broken ridges on each segment terminated at caudal margin of sternite VI; fold lateral to ventral spiracles present from sternum III to spiracle on sternum VI (Fig. 157). External genitalia: segment VIII subrectangular; genital capsule short, rounded, total length of segment VIII not reached (Fig. 132). Total body length: 4.0 mm.

Variation. — Females generally larger but with similar body proportions, connexival suture entire dorsally, sinuate on sternites VII (Fig. 181, 207).

Type material. — Paratypes. ARIZONA - Cochise County: Chirichua Mountains, September 14, 1938, 2♂, 1♀, (Knull, CINC), 1♀ same date, (AMNH), July 14, 1936, 2♂, (Knull, CINC), June 15, 1939, 2♀, (Knull, CINC); Huachuca Mountains, August 6, 1905, 1♀, (NMNH), August 12, 1950, 1♀, (Knull, NMNH), Huachuca Mountains, 1♂, 1♀, (NMNH).

Derivation of specific epithet. — *Aneurus arizonensis* is named to indicate this species is known to date only from the state of Arizona.

Geographical distribution. — Arizona mountains (Map 4).

Relations. — This species is related to *A. fiskei* on the basis of similarities shared by specimens of the two species in the reduced connexival suture pattern on the sternum.

Aneurus fiskei Heidemann

Aneurus fiskei Heidemann, 1904:164; Sherman, 1905:9; Torre-Bueno, 1908:227; Van Duzee, 1917:142; Britton, 1923:739; Blatchley, 1926:331; Usinger and Matsuda, 1959:100; Kormilev, 1968b:3.

Holotype. — No. 8049 USNM.

Comparisons. — This species is unique in its combination of small body size, spiracle pattern, with both antennal segments I and II rounded.

Description. — ♂, New York: Westchester County: White Plains, September 7, 1907 (CAS). Color: rusty-yellow-brown. Surface rugulose. Antennal segment I obovate, II subobovate, III cylindrical, IV fusiform; ratio of segment lengths 1.1:1.1:2.2:5 (Fig. 25). Head: length/width ratio 1:1.1; tylus length to apical third of antennal segment I; antenniferous tubercles length to base of antennal segment I; postocular tubercles denticulate, short, not extended to lateral margins of eyes (Fig. 53). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate, mildly serrate; length/width ratio 1:2 (Fig. 81). Scutellum semicircular, anterolateral ridges present; length/width ratio 1:1.5; scutellar whorl pattern a granular surface of faint concentric ridges parallel to posterior and lateral margins (Fig. 109). Abdomen subovoid; width 1.7 1/2 mm; spiracles II and VII lateral, III through VI ventral, equally distant from lateral margin; connexival suture entire dorsally (Fig. 136), ventrally present as a series of broken ridges, forked on sternum VII; fold lateral to ventral spiracles absent (Fig. 161). External genitalia: segment VIII deltoid; genital capsule equal in length to segment VIII (Fig. 136). Total body length: 3.9 mm.

Variation. — Female abdomen shows connexival suture entire dorsally, and sinuate on sternite VII (Fig. 187, 213).

Geographical distribution. — United States, Mexico and Cuba (Map 3).

Relations. — *Aneurus fiskei* is related to *A. inconstans* by virtue of the spiracle pattern and sinuate connexival suture conditions on sternites shared by females of the two species.

Material examined. — 49♂, 40♀. ILLINOIS - Jackson County: Carbondale (INHS). MICHIGAN - Berrien County: Warren Woods, E.K. Warren Preserve (Hussey, NMNH). Allegan County: Allegan (Psota, FMNH). OHIO - Hocking County: (Knull, NMNH). Delaware County: June 21, (Knull, NMNH). Fairfield County: (Knull, NMNH). PENNSYLVANIA - Bedford County: (Heidemann, NMNH). CONNECTICUT: Fairfield County: New Canaan (Favreau, AMNH); Brookfield (CAS). NEW YORK - Westchester County: White Plains (BM), (AMNH), (Lacey, AMNH), (Olsen, AMNH), (UKL), (CAS); Pelham, (Lacey, AMNH); New Rochelle, (Lacey, AMNH). Orange County: Bear Mountain, (Schott, AMNH). Suffolk County: Wyandanch, (Schott, AMNH); Yaphank, (NMNH); Sea Cliff (AMNH); Cold Spring Harbor (Parshley, CAS), (Torre-Bueno, UKL). NEW JERSEY - Bergen County: Fort Lee District (NMNH), (Zabriskie, AMNH). Passaic County: Ramapo Mountains: Bear Swamp, July 11, (NMNH). Morris County: Newfoundland, (NMNH). MARYLAND: Montgomery County: Plimmers Island, (Barber, NMNH), (McAtee, NMNH), (Schwartz, NMNH); 2 miles east of Silver Spring (Nelson, NMNH). DISTRICT OF COLUMBIA: in flight, (Sabrosky, NMNH). VIRGINIA: Fauquier County: Paris (NMNH). Lee County: Stone Creek, (AMNH), Jones Creek, (AMNH). NORTH CAROLINA: Polk County: Tryon, (Fiske, NMNH) (Cotype). Cherokee County: Soco Valley (Green, CAS); Black Mountains (Beutenmuller, AMNH), (AMNH). TENNESSEE - Smoky Mountains National Park, (Bullock-Dreisbach, NMNH). TEXAS - Colorado County: Columbus, (Schwartz, CAS). MEXICO. NUEVO LEON. Chipinique Mesa near Monterrey, 5,400', (Howden, CNC), July 22, 1963, (Howden, CNC), (Howden, CNC). CUBA. San Vicente de Vinales, (Archer, AMNH); Soledad near Cienfuegos, August 6, 1920, (Weber, AMNH). Range of dates of collection: throughout the year.

Aneurus inconstans Uhler

Aneurus inconstans Uhler, 1871:105, 1878:420; Stal, 1873:146; Provancher, 1887:169; Bergroth, 1892:737; Lethierry and Severin, 1896:46; Van Duzee, 1894:182, 1917:14; Blatchley, 1926:329; Torre-Bueno, 1908:227, 1935:113-114; Britton, 1923:739; Usinger and Matsuda, 1959:100; Kormilev, 1968b:10.

Holotype. — ♂, No. 13, Harris Collection, "Aradus sanguinosus Say, Mss., May 29th. 1822 Mass, on a fence" (CAS).

Comparison. — Specimens of *A. inconstans* are distinguished from specimens of all other species of *Aneurus* in this revision by the unique scutellar shape and well developed antero-lateral ridges (Fig. 113).

Description. — ♂, New Jersey: Passaic County: Greenwood Lake (AMNH). Color deep reddish brown-black. Surface rugulose. Antennal segment I obovate, II clavate, III terete, IV fusiform; ratio of segment lengths 1:1.2:1.6:2 (Fig. 29). Head: length/width ratio 1:1.1; tylus length to mid-length of antennal segment I; antenniferous tubercles to base of antennal segment I; postocular tubercles short, rounded (Fig. 57). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate; length/

width ratio 1:2 (Fig. 85). Scutellum elongate, lateral margins sinuate; length/width ratio 1:1.1; scutellar whorl pattern a faint rounded median longitudinal ridge surrounded by concentric ridges parallel to posterior and lateral margins (Fig. 113). Abdomen subovoid; width 2.6 mm; spiracles II and VII lateral, III through VI ventral, equally distant from lateral margin; connexival suture entire dorsally (Fig. 139), present as faint series of ridges on sternum III through VI, terminated at caudal margin of sternum VI; fold lateral to ventral spiracles absent (Fig. 164). External genitalia: segment VIII deltoid; genital capsule slightly longer than segment VIII (Fig. 139). Total body length: 5.0 mm.

Variation. — ♀, connexival suture sinuate on sternite VII, suture entire dorsally (Fig. 191, 217).

Geographic distribution. — Canada and the United States (Map 2).

Relations. — This species is related to *A. fiskei* as indicated by the sinuate condition of the connexival suture on sternum VII.

Material examined. — 110♂, 132♀. CANADA. ALBERTA - Bilby (Bryant, CAS). NOVA SCOTIA - Smith's Cove (CAS). QUEBEC - Knowlton (Walley, CAS), (Brown, CAS); Montreal Island (UKL). UNITED STATES. MAINE - Cumberland County (Nocolay, AMNH). Penobscot County: Orono, (AMNH). Hancock County: Mount Desert Island (AMNH). Piscataquis County: Mount Katahdin (NMNH). Kennebec County: Augusta (Brower, NMNH). Washington County: Dennysville, on fir (NMNH). NEW HAMPSHIRE - Coos County: Mount Washington (AMNH); Randolph, (Bell, AMNH), (Sherman, AMNH); Crawford, (Parshley, FMNH), (Parshley, CAS). Grafton County: Franconia, (AMNH). VERMONT - Washington County: Montpelier, (Parshley, FMNH). MASSACHUSETTS - Essex County: Ipswich, (Darlington, BM). Hampshire County: Amherst (Erikson, NMNH); Leeds, (Parshley, FMNH), (Parshley and Torre-Bueno, CAS); Northampton, under bark of apple (Parshley, CAS), (Thompson, CAS). Berkshire County: Cummington, April 4, 1934, 1,400' (Gurney, NMNH), under bark, (Gurney, NMNH). Suffolk County: Boston (Parshley, CAS). Middlesex County: Sherborn (NMNH); Tyngsboro (AMNH); Holliston, (Banks, AMNH). Nortolk County: Blue Hills Range (Johnson, AMNH). Franklin County: Mount Toby, Sunderland (Parshley, CAS). "Massachusetts", (AMNH). NEW YORK - Saint Lawrence County: Cranberry Lake (NMNH), (Drake, BM). Clinton County: Whiteface Mountain (Maldrich, NMNH), 1♀, (Leng, NMNH). Essex County: Keene Valley, (Notman, NMNH). Onedia County: Trenton Falls (NMNH). Wayne County: Macedon (Hood, NMNH), under bark of maple stump (Hood, NMNH), under bark of beech log (Hood, NMNH), under bark of maple stump (Hood, NMNH), under dead willow bark (Hood, NMNH), May 4, elder bark, (NMNH). Tompkins County: Ithaca, (NMNH), (Van Dyke, CAS). Erie County: Colden, (Van Duzee, CAS); Lancaster, (Van Duzee, CINC); Hamburg, (Van Duzee, CAS); Buffalo, (Van Duzee, CAS), "aspen" (Van Duzee, CAS), (Van Duzee, CAS), (NMNH). Greene County: Tannersville, Onteora Park, 2,400 - 2,600' (Torre-Bueno, UKL), (Torre-Bueno, CINC); "Green County", 2,500', June (Howard, NMNH), Cattaraugus County: Gowanda (Van Duzee, CAS). Niagara County: Niagara Falls, (MCV, CAS). Orange County: West Point (Robinson, NMNH). Westchester County: White Plains, (UKL), (AMNH), (BM); Tuckaheo (AMNH). Suffolk County: Yaphank (NMNH); Cold Spring Harbor, (Parshley, CAS); Nassau County: Sea Cliff, (AMNH). Queens County: Rockaway Beach, (Barber, NMNH). NEW YORK - Adirondack Mountains, Cascade Lake, (NMNH). Grandview (NMNH); "New York" (NMNH). RHODE ISLAND: (NMNH). CONNECTICUT - Fairfield County: Stamford (NMNH). Litchfield County: Prospect (O'Brien, OBTF). MICHIGAN - Midland County (Dreisbach, AMNH). Cheboygon County: Douglas Lake (Hungerford, UKL). INDIANA - Morgan County, (Misgrave, AMNH). Tippecanoe County: West Lafayette, McCormick Woods (O'Brien, OBTF); Turkey Run State Park (O'Brien, OBTF). OHIO - Summit County (Lipovsky, UKL). PENNSYLVANIA - Philadelphia County: Philadelphia, Morris Park (Lutz, NMNH). McKean County: Bradford, under bark of young apple tree, (Munn, NMNH). County not determined: North Bloomfield (Guyton, NMNH). NEW JERSEY - Union County: Roselle Park, under beech bark, (Barber, NMNH); (Torre-Bueno, ANMH), (UKL); Plainfield, (AMNH). Passaic County: Ramapo Mountains, Bear Swamp, (NMNH); Greenwood Lake, (Schott, AMNH). Middlesex County: New Brunswick, under dead *Acer rubrum* bark (Hlavac, AMNH); Milltown, (AMNH). Warren County: Hackettstown (NMNH). Morris County: Boonton (Greene, ANSP). Gloucester County: Westville (Lutz, NMNH); New England, (AMNH). DELAWARE - New Castle County: Newark (Burr, UTAH). MARYLAND - Prince Georges County: College Park (Knab, FMNH). DISTRICT OF COLUMBIA: (NMNH). VIRGINIA: Arlington County, (Lushman, NMNH). County not determined: Glencaryn (AMNH). NORTH CAROLINA - Macon County: Highlands, Whiteside Mountain, 4,900', (Mason, CNC). Range of dates of collection: March to October.

Aneurus borealis new species

Holotype. — ♀, Alaska: Fairbanks, No. 31, 9339, June 8, 1946, on birch leaf, (NMNH).

Comparison. — This species is similar to *A. inconstans* as reflected by its spiracle pattern, but easily distinguished by its larger size, lighter color, thick tylus and dilated lateral margin of abdominal segment VI.

Description. — Color orange-brown. Surface rugulose. Antennal segment I subobovate, II clavate, III terete, IV fusiform, ratio of segment lengths 1:1.2:1.7:2.3 (Fig. 21). Head: length/width ratio 1:1, tylus thick, length of proximal third of antennal segment II; antenniferous tubercles acute, length to proximal third of antennal segment I; postocular tubercles short, lateral margins of eyes not reached (Fig. 49). Pronotum subtrapezoidal, wider posteriorly, lateral margins strongly sinuate; length/width ratio 1:1.1; scutellar whorl pattern faint ridges concentrically parallel to posterior and lateral

scutellar margins (Fig. 105). Abdomen elongate, sides sub-parallel; spiracles II and VII lateral, III through VI ventral and equally distant from lateral edge; connexival suture dorsally sinuate on tergum VIII around callosity to form pseudosegment (Fig. 183), ventrally connexival suture present as faint series of ridges, (sinuate on sternite VII around callosity to form pseudosegment) terminated at caudal margin of sternite VI; fold lateral to ventral spiracles present on sterna III through VII spiracle on sternite VI (Fig. 209). External genitalia: (Fig. 183). Total body length: 6.5 m.

Variation. — Males with flares on abdominal segments VI and VII, connexival suture dorsally sinuate on tergum VII around callosity to form pseudosegment, ventrally suture present as faint series of ridges, terminated at caudal margin of sternum VI; fold lateral to ventral spiracles present on sternite III to spiracle on sternite VI. Segment VIII deltoid; genital capsule flattened dorsoventrally, extended beyond segment VIII by one third capsule length (Fig. 133, 158).

Type material. — Paratypes: CANADA. YUKON TERRITORY - Kirkman Creek, June 13, 1929, 1♀, (Barrett, CINC). BRITISH COLUMBIA - Findlay Forks, June 22, 1930, 1♀, (Graham, UBC). SASKATCHEWAN - Meadow Lake, June, 1935, 1♀, (Peters, CNC), June 8, 1933, 1♀, found in house, (CNC). ONTARIO - Sudbury, May 18, 1889, 3, (Evans, CAS). QUEBEC - Cascapedia River, August 7, 1933, 1♂, (Reeks, CNC). UNITED STATES. ALASKA - Fairbanks, June 8, 1958, 2♀, (Washburn, NMNH). MAINE - Kennebec County: Augusta, May 23, 1949, 1♂, on clothes (Browsers, NMNH).

Derivation of specific epithet. — This species is named to reflect its northern affinities.

Geographical distribution. — Northern U.S. and Canada extending north of the Arctic Circle (Map 1).

Relations. — *Aneurus borealis* is most closely related to *A. maryae* as shown by the incomplete connexival suture condition on the ♀ sternite VI.

Aneurus maryae new species

Holotype. — ♂, Mexico: Michoacan, 3.4 miles east of Morelia, July 2, 1963, J. Doyen, (CAS).

Comparison. — Specimens are similar to those of *Aneurus inconstans* in having the same spiracle pattern, but are easily distinguished by a bi-color pattern and uniformly elongate scutellum.

Description. — Color head, pronotum and scutellum black; abdomen dark red-black. Surface rugulose. Antennal segment I obovate, II fusiform, III terete, IV fusiform; ratio of segment lengths 1.3:1:1.4:2.6 (Fig. 31). Head: length/width ratio 1:1.1; tylus length almost to distal end of antennal segment I; antenniferous tubercles acute, short, length to base of antennal segment I; postocular tubercles extended to lateral margin of eyes (Fig. 59). Pronotum subtrapezoidal, wider posteriorly, lateral margins sinuate, length/width ratio 1:2.1 (Fig. 87). Scutellum elongate with antero-lateral ridges; length/width ratio 1:1.2; scutellar whorl pattern a mid-anterior "u" shape surrounded by concentric ridges parallel to posterior and lateral margins (Fig. 115). Abdomen subovoid; width 2.8 mm; spiracles II and VII lateral, III through VI ventral, equally distant from lateral edge; connexival suture entire dorsally (Fig. 141), ventrally present as a series of faint broken ridges terminated at caudal margin of sternum VI, to reappear as sinuate depressions on caudal half of sternum VII; fold lateral to ventral spiracles present from sternite III to spiracle VII on sternum VII (Fig. 166). External genitalia: segment VIII deltoid; genital capsule slightly longer than segment VIII (Fig. 141). Total body length: 6.5 mm.

Variation. — Females are generally larger than males; connexival suture present on sternites III to anterior half of sternum VII and is sinuate around a callosity to form a pseudosegment (Fig. 193, 219).

Type material. — Paratypes: MEXICO - Michoacan: 3.4 miles east of Morelia, July 2, 1963; 28♂, 31♀, (Doyen, CAS), 1♂, same data (AMNH).

Derivation of specific epithet. — This species is named in honor of my mother, Mary Katherine Dougherty.

Geographic distribution. — Mexico (Map 7).

Material examined. — MEXICO: Guerrero: Omiltemi, July 14-15, 1966, 2♂, 2♀, 7,300', (Ball, Whitehead, NMNH).

Aneurus pusillus Kormilev

Aneurus pusillus Kormilev, 1968b:3-4.

Holotype. — ♂, Guatemala: Cacao, Trece Aguas, Alta v. Paz, Schwarz and Barber coll., USNM type No. 69794.

Comparison. — Species are unique among North American *Aneurus* in the spiracle pattern.

Description. — ♀, Panama: Canal Zone: 3 mi. NW Gamboa, (Hespenheide, PICCHI). Color uniformly orange-brown. Surface rugulose. Antennal segment I obovate, II and IV fusiform, III terete: ratio of segment lengths 1:1:1:2, (no figure, specimen available for illustration headless). Head length/width ratio 1:1.2; tylus scarcely extended to attain distal end of antennal segment I; antenniferous tubercles poorly developed; postocular tubercles length just to lateral margins of eyes. Pronotum subtrapezoidal, wider posteriorly, all four margins sinuate; length/width ratio 1:1.5. Scutellum subtriangular, apex rounded posteriorly; length/width ratio: 1:1, scutellar whorl pattern a set of concentric broken ridges parallel to lateral and posterior margins (Fig. 122). Abdomen elongate, sides subparallel, width 1.0 mm; spiracles II, V, VI, VII lateral, III and IV ventral located close to lateral margin; connexival suture sinuate posteriorly on tergum VII (Fig. 199), ventrally present as a faint series of parallel broken ridges terminated at caudal margin of sternum VI; fold lateral to ventral spiracles faintly present through sternum VI (Fig. 225). External genitalia: as in Fig. 199. Total body length: 3.45 mm.

Variation. — Male external genitalia: segment VIII subrectangular, genital capsule elongate, extended posteriorly about 1 1/2 times length of segment VIII.

Geographic distribution. — southern Central America (Map 7).

Relations. — *Aneurus pusillus* is most closely related to *A. usingeri* as indicated by shared very reduced ventral connexival suture on the abdomen of females.

Material examined. — 2♂, 2♀. PANAMA. Canal Zone: Bohio, February 6-9, 1911, (Schwarz, NMNH) (2 paratypes); Paraiso, February 9, 1911, (Schwarz, NMNH); 5 miles south of Gatun Locks, January 10, 1974, (Slater and Harrington, JSSC).

Aneurus usingeri new species

Holotype. — ♂, Panama: Volcán de Chiriqui, 2-3,000', (Champion, BM).

Comparison. — Specimens have a similar spiracle pattern to those of *A. minutus* but are distinguished by the abdominal fold lateral to the ventral spiracles on sternites II and IV, only.

Description. — Color uniformly rusty brown with darker brown wing membrane. Surface rugulose. Antennal segment I obovate, II subobovate, III terete, IV fusiform; ratio of segment lengths 1.3:1:1.2:2.7 (Fig. 42). Head length/width ratio 1:1, tylus extended to distal end of antennal segment I; postocular tubercles moderately developed, not extended to lateral margin of eyes (Fig. 70). Pronotum subtrapezoidal, wider posteriorly, all four margins strongly sinuate; length/width ratio 1:2 (Fig. 98). Scutellum subtriangular, length/width 1:1.2; scutellar whorl pattern a mid-anterior oval callosity surrounded by concentric ridges, parallel to lateral and posterior scutellar margin (Fig. 127). Abdomen subovoid, posterior lateral margins of abdomen serrate; width 1.6 mm; spiracles II, VI, VII lateral, III, IV, V ventral and equally distant from lateral edge; connexival suture entire dorsally (Fig. 152), ventrally present only as faint series of ridges terminated at caudal margin of sternum VI; fold lateral of ventral spiracles present only on sterna III and IV (Fig. 177). External genitalia: segment VIII rectangular; genital capsule flattened dorso-ventrally; and squared distally, not extended to posterior margin of segment VIII (Fig. 152). Total body length: 3.5 mm.

Variation. — Female connexival suture sinuate on tergum VII, ventrally connexival suture present as faint series of ridges terminated at caudal margin of sternite VI (Fig. 204, 230).

Type material. — Paratypes: PANAMA - Volcán de Chiriqui, 2-3,000', 1♀, (Champion, BM); 2,500-4,000', (Champion, BM). MEXICO - Veracruz: Acayucan, October 23, 1957, (Driesbach, NMNH). GUATEMALA - Escuintla: El Zapote, (Champion, BM).

Geographic distribution. — Central America (Map 9).

Derivation of specific epithet. — This species was named in honor of Dr. R.L. Usinger in recognition of his excellent work with Hemiptera, in particular Aradidae.

Relations. — This species is most closely related to *A. pusillus* as indicated by their similar reduced connexival suture patterns.

Aneurus montanus Champion

Aneurus montanus Champion, 1898:114; Usinger and Matsuda, 1959:100; Kormilev, 1968b:3.

Holotype. — ♂; Guatemala: Totonicapán, (BM).

Comparison. — This species is the only one of Central American *Aneurus* with uniformly deep red-brown specimens.

Description. — Color dark red-brown. Surface rugulose. Antennal segment I subobovate, II fusiform, III cylindrical, IV fusiform; ratio of segment lengths: 1.4:1:1.8:2.9 (Fig. 33). Head length/width ratio 1:1.1; tylus length not to distal tip of antennal segment I; antenniferous tubercles well developed, not extended to outer margin of eye (Fig. 61). Pronotum subtrapezoidal, wider posteriorly, all four margins sinuate; length/width ratio 1:2 (Fig. 89). Scutellum subtriangular, very rounded posteriorly; length/width ratio 1:1.6, scutellar whorl pattern a mid-longitudinal ridgelet; anterolateral ridges present (Fig. 117). Abdomen subovate, width 2.3 mm; spiracle pattern II and VII lateral, III through VI ventral and equally distant from lateral margin; connexival suture entire dorsally (Fig. 143); ventrally connexival suture a series of parallel ridgelets present on sterna III through VII; ventral fold lateral to spiracles absent (Fig. 168). External genitalia; segment VIII subrectangular; genital capsule elongate, extended to just past segment VIII posteriorly (Fig. 143). Total body length: 5.3 mm.

Variation. — Female with connexival suture entire on both dorsal and ventral surface; fold lateral to ventral spiracles absent (Fig. 195, 221).

Geographic distribution. — Southern Central America (Map 9).

Relations. — This species is closely related to *Aneurus usingeri* as shown by the similar connexival suture pattern and the loss of the ventro-lateral abdominal fold shared by members of these two taxa.

Material examined. — holotype and allotype. GUATEMALA - Totonicapán, 8,500 - 10,000' (BM).

Aneurus slateri new species

Holotype. — ♂, Bahama Islands: Andros Island: Andros Town, Fresh Creek, III-17-65, (Valentine, Hamilton, AMNH).

Comparison. — Specimens are distinguished by combination of small body size, elongate abdomen and contrasting wing-body color.

Description. — Color body orange-brown; wings dark brown, pale yellow at base. Surface rugulose. Antennal segment I and II subobovate, III and IV fusiform; ratio of segment lengths 1:1.4:1.2:4 (Fig. 40). Head length/width 1:1.1; tylus extended just to distal end of antennal segment I; antenniferous tubercles well developed extended anteriorly beyond base of antennal segment I; postocular tubercles poorly developed not extended to outer margin of eye (Fig. 68). Pronotum subtrapezoidal, wider posteriorly, all four margins mildly sinuate, length/width ratio: 1:1.9 (Fig. 96). Scutellum subtriangular but rounded at all three corners, length/width ratio: 1:1.3, distinct scutellar whorl pattern absent (Fig. 125). Abdomen elongate, width 1.0 mm; spiracle pattern II, VI, VII lateral, III, IV, V ventral, very near ventral fold; connexival suture entire dorsally (Fig. 150); ventrally connexival suture absent on all segments except for faint impression around callosity on sternum VII; ventral fold present, well developed on sternites II through VI, absent from sternum VII (Fig. 175). External genitalia: segment VIII short, rounded; genital capsule short, rounded, extended just beyond length of segment VIII (Fig. 150). Total body length: 3.5 mm.

Variation. — Females similar to males except the abdominal fold on ventro-lateral margins present on sterna II through VII (Fig. 202, 228).

Type material. — Paratypes: 1♀, from same locality as holotype, deposited at AMNH; 1♂, 1♀, from same locality deposited at Ohio State University.

Geographic distribution. — Bahama Islands (Map 3).

Derivation of specific epithet. — This species is named in honor of Dr. James Slater, noted hemipterist and my advisor.

Relations. — This species is related to *A. usingeri* as indicated by the similarity of the connexival suture patterns.

Aneurus veracruzensis new species

Holotype. — ♂, Mexico: Vera Cruz, Koebele collection, (CINC).

Comparison. — Specimens are similar to those of *A. usingeri* in spiracle pattern, but differ significantly in head proportions and much larger size.

Description. — Color deep reddish gold-brown, wing membrane darker brown. Surface moderately rugulose. Antennal segment I obovate, II subovate, III terete, IV fusiform; ratio of segment length 1:1:1:2 (Fig. 44). Head length/width ratio: 1:1.1; tylus length to distal end of antennal segment I; antenniferous tubercles short, length to base of antennal segment I, postocular tubercles moderately developed, extended to lateral margin of eyes (Fig. 72). Pronotum subtrapezoidal, wider posteriorly, all four margins strongly sinuate; length/width ratio 1:2, (Fig. 100). Scutellum subtriangular; length/width ratio 1:1.3; scutellar whorl pattern a set of concentric ridges parallel to lateral and posterior margins (Fig. 129). Abdomen subovoid; posterior-lateral margin serrate; width 1.7 mm; spiracle pattern: II, VI, VII lateral, III, IV, V ventral and equally distant from lateral margin; connexival suture complete dorsally (Fig. 154), ventrally present as a series of parallel broken ridges terminated at caudal margin of segment VI, connexival suture again on posterior of sternum VII as sinuate fold around callosity; fold lateral to ventral spiracles well developed to caudal margin of sternum VI (Fig. 179). External genitalia: segment VIII subcylindrical; genital capsule short, rounded, not extended to distal end of segment VIII (Fig. 154). Total body length: 3.95 mm.

Variation. — One male specimen from Guerrero, Mexico is larger than the type (4.3 mm), but similar in all other morphological characters. No females of this species have been seen.

Derivation of specific epithet. — This species is named for its type locality.

Geographical distribution. — Central America (Map 6).

Relations. — This species is related to *A. usingeri* as reflected in the similarity of spiracle pattern shared by their members.

Material examined. — MEXICO. GUERRERO - 5 miles north of Chilpancingo, August 25, 1958, (Howden, CNC).

Aneurus barberi Kormilev

Aneurus barberi, Kormilev, 1960:218, 1968b:2.

Holotype. — ♀, St. Lucia, BWI, Quillesse, R.G. Fennah coll., 2-22-41 (USNM).

Comparison and statements of relationship with other *Aneurus* species is withheld until more material is available.

Description. — Color golden brown with dark brown wings. Antennal segment I subobovate, II terete, III cylindrical, IV fusiform; ratio of segment lengths: 1.2:1.2:1.3 (Fig. 20). Head: length/width ratio 1:1.2; tylus extended to base of antennal segment II; antenniferous and postocular tubercles absent (Fig. 48). Pronotum subtrapezoidal, wider posteriorly, all four margins very sinuate; length/width ratio 1:2 (Fig. 76). Scutellum subtriangular, apex rounded posteriorly; length/width ratio 1:1.6; scutellar whorl pattern a mid-anterior oval callosity surrounded by concentric ridges parallel to posterior and lateral margin; anterolateral ridges present (Fig. 104). Abdomen elongate; width 3.5 mm; abdominal spiracle pattern II, VI and VII lateral, III, IV, V on ventral fold; connexival suture entire dorsally (Fig. 182), ventrally connexival suture present as a series of broken parallel ridges medial to ventral spiracles from sternum II through VI, callosity on sternite VII encircled; ventral fold well developed as ridge from sternite II to midlength of sternum VII, (Fig. 208). External genitalia as in Fig. 182. Total body length: 6.7 mm.

Variation. — This is the only specimen available of this species.

Aneurus nasutus Kormilev

Aneurus nasutus, Kormilev, 1966:7-8, 1967b:2.

Holotype. — ♂, Guadeloupe (NMNH).

Comparison. — This species is distinguished by combination of shiny body surface and contrasting wing-body color of its members.

Description. — Color orange-brown with darker brown wings. Surface shiny. Antennal segment I subobovate, II terete, III cylindrical, IV fusiform; ratio of segment length 1.3:1:1.3:2.7 (Fig. 34). Head length/width ratio 1:1.1; tylus absent (Fig. 62). Pronotum subtrapezoidal, wider posteriorly; all four margins sinuate; length/width ratio 1:2 (Fig. 90). Scutellum subtriangular, apex rounded posteriorly; length/width ratio 1:1.6; scutellar whorl pattern a series of midanterior longitudinal ridgelets surrounded by concentric ridgelets parallel to lateral and posterior margins (Fig. 118). Abdomen subovate, width 3.2 mm.

spiracle pattern II, VI and VII lateral, III, IV and V ventral on the ventral fold; connexival suture entire dorsally (Fig. 144); ventrally connexival suture remains as very faint series of parallel ridgelets; ventral fold well developed from sternum II to mid-sternum VII (Fig. 169). External genitalia: segment VIII subrectangular; genital capsule short, rounded, just extended past segment VIII posteriorly (Fig. 144). Total body length: 7.3 mm.

Variation. — The holotype is the only specimen of this species available for study.

Geographical distribution. — Southern Carribean (Map 8).

Relations. — This species relationship to other species of *Aneurus* cannot be determined until more material is studied.

ACKNOWLEDGEMENTS

I started this work while employed at the American Museum of Natural History and I would like to thank Lee Herman, Patricia Vaurie and Deborah Berry for their encouragement. The work was completed at the University of Connecticut and I thank James Slater and Carl Schaefer for reviewing this manuscript. Thanks are also extended to Kathleen Schmidt for the drawing of *Aneurus patriciae* new species and Charles Pawlowicz for his instructions on the use of the SEM. George E. Ball should also be cited for the patience and interest he has expressed during the revisions of this manuscript.

Appreciation is extended to the following entomologists with whom I corresponded concerning aradids and to their respective institutions from which I was able to borrow material: P. Arnaud (California Academy of Sciences); P.D. Ashlock (University of Kansas); R.M. Baranowski, R. Mead and H.V. Weems (Florida State Arthropod Collection); J. Powell (California Insect Survey); H. Dybas, R. Wenzel and Mr. M. Prokop (Field Museum of Natural History); R.C. Froeschner (National Museum of Natural History); Dr. Hansen (Utah State University); Henry Hespeneheide (University of California, Los Angeles); W.J. Knight and W. Dolling (British Museum, Natural History); N.A. Kormilev (Brooklyn, New York); J. Lawrence and A. Newton (Harvard University); R. Matsuda (Canadian National Collection); G. Monteith (University of Queensland); L. O'Brien (Tallahassee, Florida); P.I. Persson (Naturhistoriska Riksmuseet, Stockholm); Mr. B. Ratcliffe (University of Nebraska); L.H. Rolston (Louisiana State University); J.C. Schaffner (Texas A & M University); G.G.E. Scudder (University of British Columbia); P. Stys (University Karlov, Prague); C. Triplehorn (Ohio State University); and D. Webb (Illinois Natural History Survey).

Special acknowledgement is extended to my friend Dr. Pedro Wygodzinsky (American Museum of Natural History) for his encouragement and patience during the writing of this paper.

LITERATURE CITED

- Barber, H.G. 1914. Insects of Florida. Bulletin of the American Museum of Natural History 33(31): 269-535.
- Bergroth, E. 1886. Zur Kenntnis der Aradiden. Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien 36: 53-60.
- Bergroth, E. 1889. Novas Aradidarum Species. Wiener Entomologische Zeitung 8(2): 49-52.
- Bergroth, E. 1892. Notes on the Nearctic Aradidae. Proceedings of the Entomological Society of Washington 2: 332-337.
- Bergroth, E. 1914. Zur Kenntnis der Gattung *Aneurus* Curtis. Annales historico Naturales Musei Nationalis Hungarici 12: 89-102.
- Blatchley, W.S. 1926. Heteroptera or true bugs of Eastern North America. Nature Publishing Company. Indiana.
- Britton, W.E. 1923. Guide to the Insects of Connecticut. Part IV. The Hemiptera or Sucking Insects of Connecticut. State Geological and Natural History Survey, Bulletin No. 34,

Hartford, Connecticut.

- Champion, G.C. 1897-1901. *Biologia Centrali-Americana*, Insecta. Hemiptera-Heteroptera. Rhynchota. II: vi, xii, 65-117.
- Curtis, J. 1828. *British Entomology*. London: Author.
- Douglas, J. and J. Scott. 1865. *The British Hemiptera*, London 1: 267.
- Heidemann, O. 1904. Notes on the North American Aradidae with descriptions of two new species. *Proceedings of the Entomological Society of Washington* 6: 161-165.
- Hussey, R.F. 1957. Two changes of name in Hemiptera (Aneuridae and Miridae). *Florida Entomologist* 40:80.
- Kormilev, N. 1960. Notes on Neotropical Aradidae XI (Hemiptera). *Journal of the New York Entomological Society* 68: 208-220.
- Kormilev, N. 1964. Notes on Neotropical Aradidae XIV (Hemiptera, Heteroptera). *Studia Entomologica* 7: 153-160.
- Kormilev, N. 1966. Notes on the Aradidae in the U.S. National Museum, IV (Hemiptera, Heteroptera). *Proceedings of the United States National Museum* 119(No. 3548): 1-25.
- Kormilev, N. 1968a. Notes on the Aradidae of the U.S. National Museum, V (Hemiptera, Heteroptera). *Proceedings of the United States National Museum* 125(No. 3651):1-16.
- Kormilev, N. 1968b. North and Central American species of *Aneuris* Curtis (Hemiptera: Aradidae). *Proceedings of the United States National Museum*, 125(No. 3657):1-12.
- Lethierry, L. and G. Severin. 1896. *Catalogue general des Hemipteres*. vol. III. Heteropteres. vol. III. Heteropteres. Brussels: F. Hayez, Imprimeur de l'Academie Royale de Belgique.
- Provancher, L. 1887. *Petite faune Entomologique du Canada*. Vol. 3, les Hemipteres. pages 1-205.
- Say, T. 1831. *Descriptions of new species of Heteropterous Hemiptera of North America*. New Harmony, Indiana, (Fitch reprint).
- Sherman, F. 1905. The Flat-Bugs of North Carolina. *Entomological News* 16: 7-9.
- Stål, C. 1873. *Enumeratio Hemipterorum*, Kongliga Svenska Vetenskaps - Akadmiens Handlingar 3:146.
- Stys, P. 1974. Morphological and taxonomic notes on the *Aneurinae* with descriptions of *Aneuris (Iralunelus* subgen. n.) *gallicus* sp. n. from France and a world list of species (Heteroptera, Aradidae). *Acta Entomologica Bohemoslovaca* 71: 86-104.
- Stys, P. 1975. *Aneuris hradyi* sp. n. from Cuba (Heteroptera, Aradidae). *Acta Entomologica Bohemoslovaca* 72: 30-33.
- Torre-Bueno, J.R. de la. 1908. Hemiptera-Heteroptera of Westchester County, New York. *Journal of the New York Entomological Society* 16:227.
- Torre-Bueno, J.R. 1935. Biological notes on Aradidae. *Bulletin of the Brooklyn Entomological Society* 30: 113-114.
- Uhler, P.R. 1871. Notices on some Heteroptera in the collection of Dr. T.W. Harris. *Proceedings of the Boston Society of Natural History* 14: 93-109.
- Uhler, P.R. 1878. Notices of the Hemiptera-Heteroptera in the collection of the late T.W. Harris, M.D. *Proceedings of the Boston Society of Natural History* 19: 365-446.
- Unger, R.L. and R. Matsuda. 1959. *Classification of the Aradidae (Hemiptera-Heteroptera)*. British Museum (Natural History), London.
- Van Duzee, E.P. 1894. A list of the Hemiptera of Buffalo and vicinity. *Bulletin of the Buffalo Society of Natural History* 5: 167-216.
- Van Duzee, E.P. 1917. *Catalogue of the Hemiptera of America North of Mexico*. Vol. II. University of California Publications Technical Bulletin.
- Walker, F. 1873. *Catalogue of the specimens of the Hemiptera Heteroptera in the collection of the British Museum*, pt. VII. British Museum (Natural History), London.

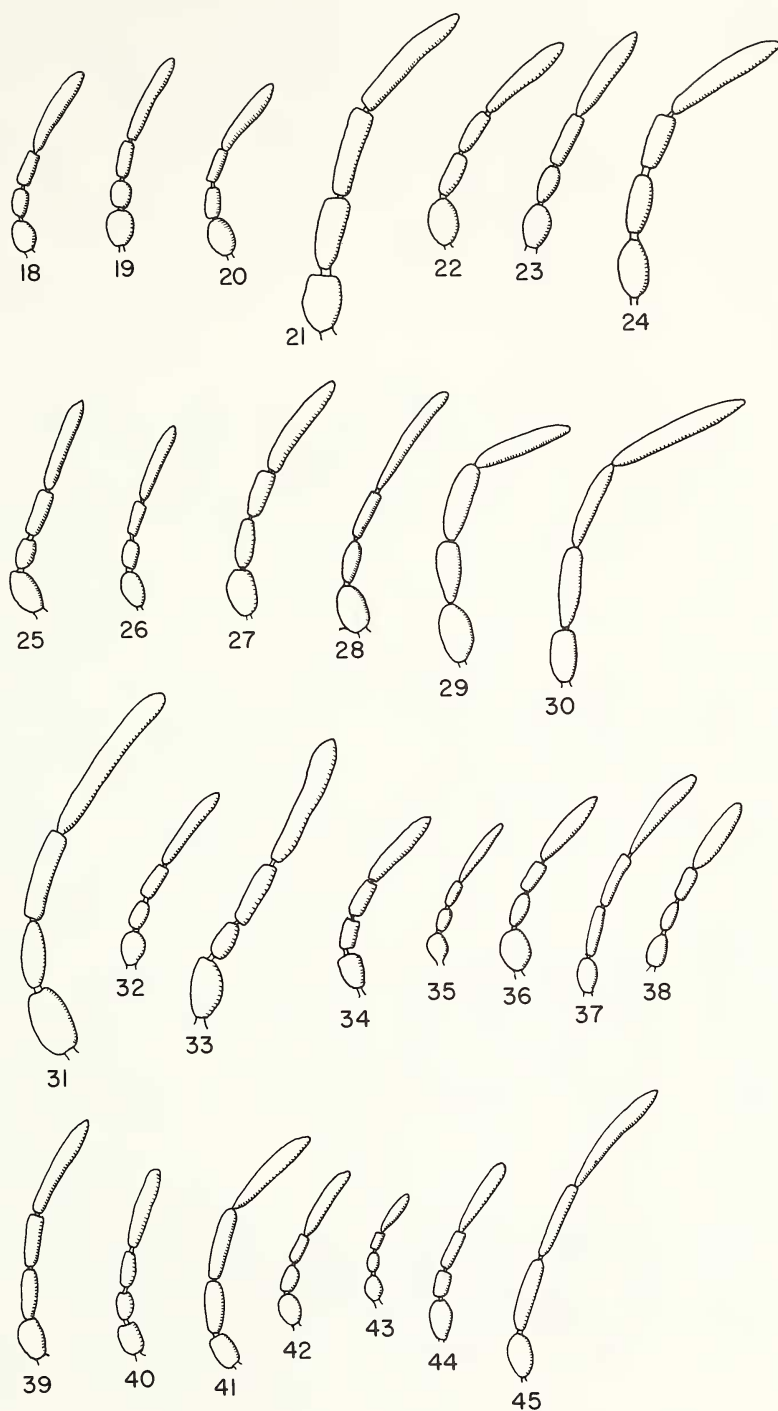


Fig. 18-45. Antennae. Fig. 18. *A. aibonitensis*; 19. *A. arizonensis*; 20. *A. barberi*; 21. *A. borealis*; 22. *A. championi*; 23. *A. deborahae*; 24. *A. dissimilis*; 25. *A. fiskei*; 26. *A. froeschneri*; 27. *A. haitiensis*; 28. *A. hispaniolensis*; 29. *A. inconstans*; 30. *A. leptocerus*; 31. *A. maryae*; 32. *A. minutus*; 33. *A. montanus*; 34. *A. nasutus*; 35. *A. neojamaicensis*; 36. *A. patriciae*; 37. *A. politus*; 38. *A. roseae*; 39. *A. simplex*; 40. *A. slateri*; 41. *A. tenuis*; 42. *A. usingeri*; 43. *A. vauriei*; 44. *A. veracruzensis*; 45. *A. wygodzinskyi*.

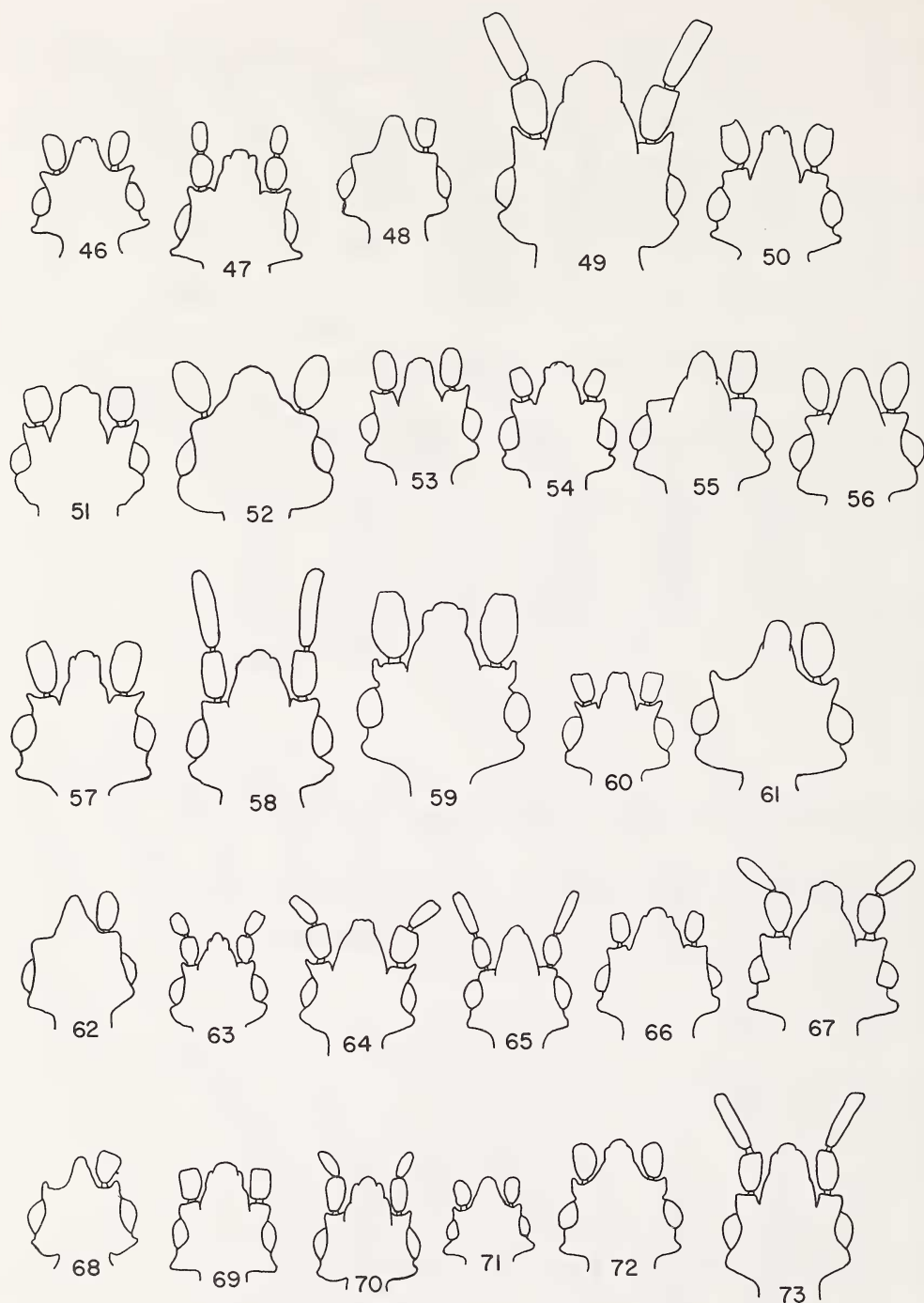


Fig. 46-73. Heads. Fig. 46. *A. aibonitensis*; 47. *A. arizonensis*; 48. *A. barberi*; 49. *A. borealis*; 50. *A. championi*; 51. *A. deborahae*; 52. *A. dissimilis*; 53. *A. fiskei*; 54. *A. froeschneri*; 55. *A. haitiensis*; 56. *A. hispaniolensis*; 57. *A. inconstans*; 58. *A. leptocerus*; 59. *A. maryae*; 60. *A. minutus*; 61. *A. montanus*; 62. *A. nasutus*; 63. *A. neojamaicensis*; 64. *A. patriciae*; 65. *A. politus*; 66. *A. roseae*; 67. *A. simplex*; 68. *A. slateri*; 69. *A. tenuis*; 70. *A. usingeri*; 71. *A. vauriei*; 72. *A. veracruzensis*; 73. *A. wygodzinskyi*.

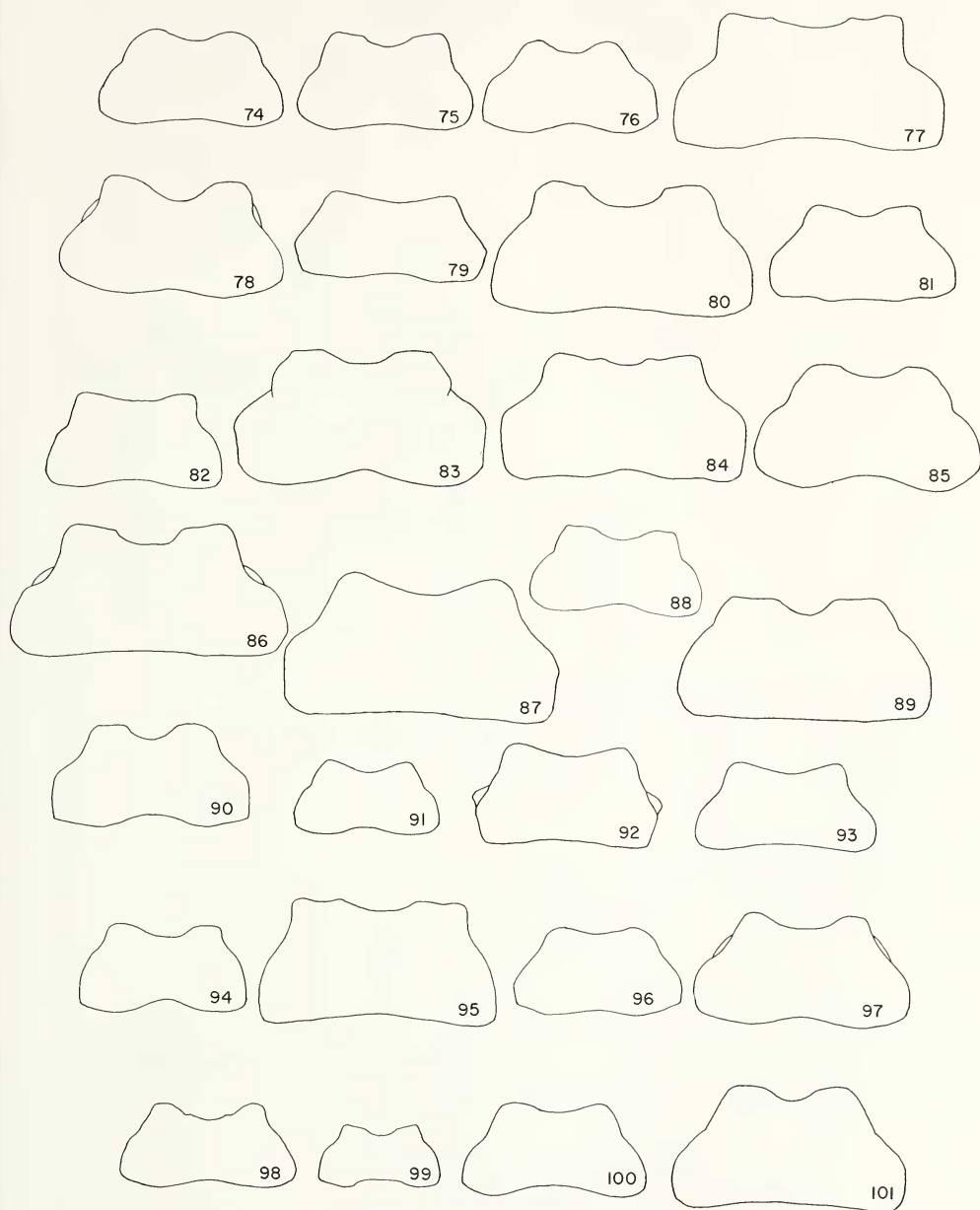


Fig. 74-101. Pronota. Fig. 74. *A. aibonitensis*; 75. *A. arizonensis*; 76. *A. barberi*; 77. *A. borealis*; 78. *A. championi*; 79. *A. deborahae*; 80. *A. dissimilis*; 81. *A. fiskei*; 82. *A. froeschneri*; 83. *A. haitiensis*; 84. *A. hispaniolensis*; 85. *A. inconstans*; 86. *A. leptocerus*; 87. *A. maryae*; 88. *A. minutus*; 89. *A. montanus*; 90. *A. nasutus*; 91. *A. neojamaicensis*; 92. *A. patriciae*; 93. *A. politus*; 94. *A. roseae*; 95. *A. simplex*; 96. *A. slateri*; 97. *A. tenuis*; 98. *A. usingeri*; 99. *A. vauriei*; 100. *A. veracruzensis*; 101. *A. wygodzinskyi*.

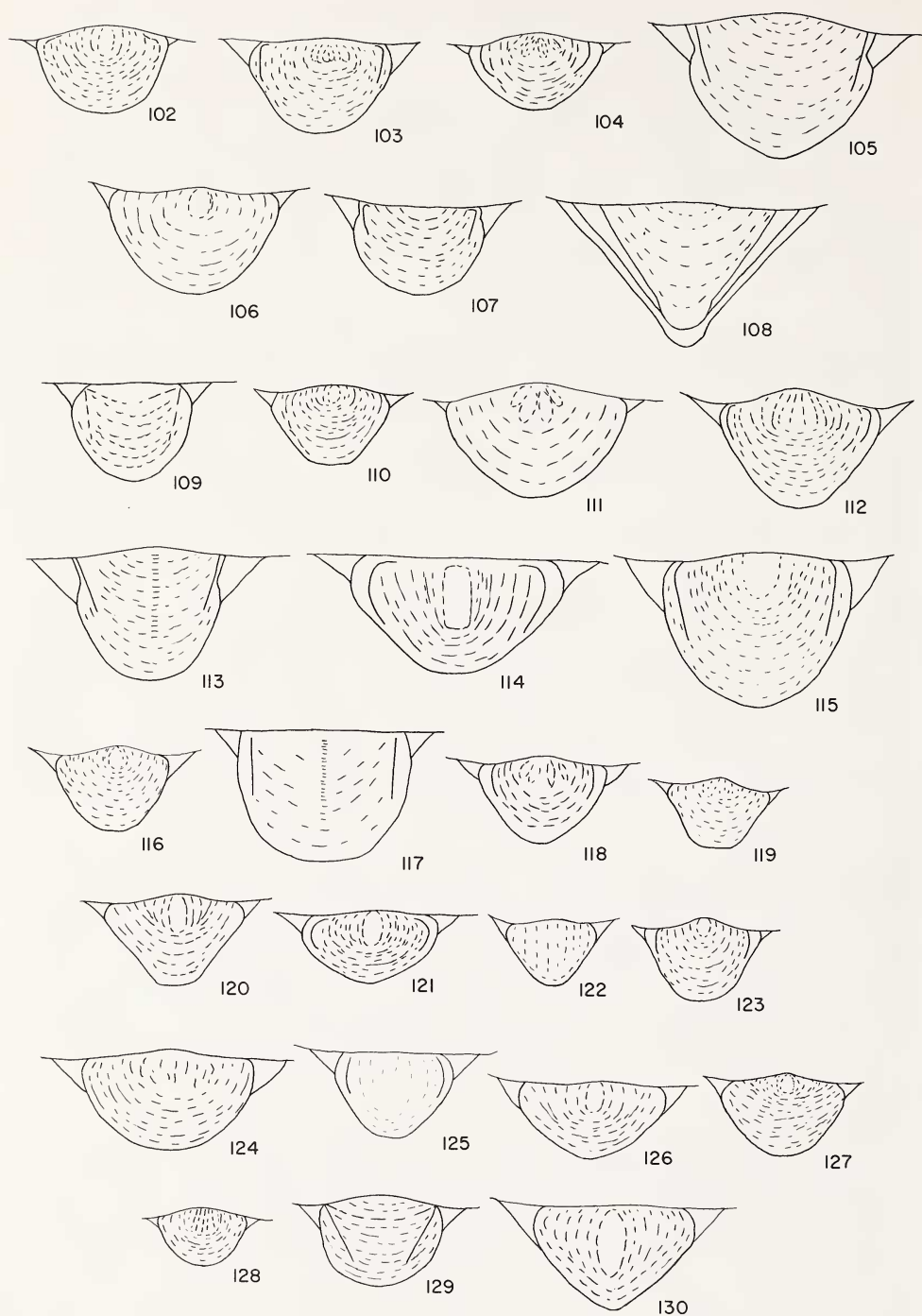


Fig. 102-130. Fig. 102. *A. aibonitensis*; 103. *A. arizonensis*; 104. *A. barberi*; 105. *A. borealis*; 106. *A. championi*; 107. *A. deborahae*; 108. *A. dissimilis*; 109. *A. fiskei*; 110. *A. froeschneri*; 111. *A. haitiensis*; 112. *A. hispaniolensis*; 113. *A. inconstans*; 114. *A. leptocerus*; 115. *A. maryae*; 116. *A. minutus*; 117. *A. montanus*; 118. *A. nasutus*; 119. *A. neojamaicensis*; 120. *A. patriciae*; 121. *A. politus*; 122. *A. pusillus*; 123. *A. roseae*; 124. *A. simplex*; 125. *A. slateri*; 126. *A. tenuis*; 127. *A. usingeri*; 128. *A. vauriei*; 129. *A. veracruzensis*; 130. *A. wygodzinskyi*.

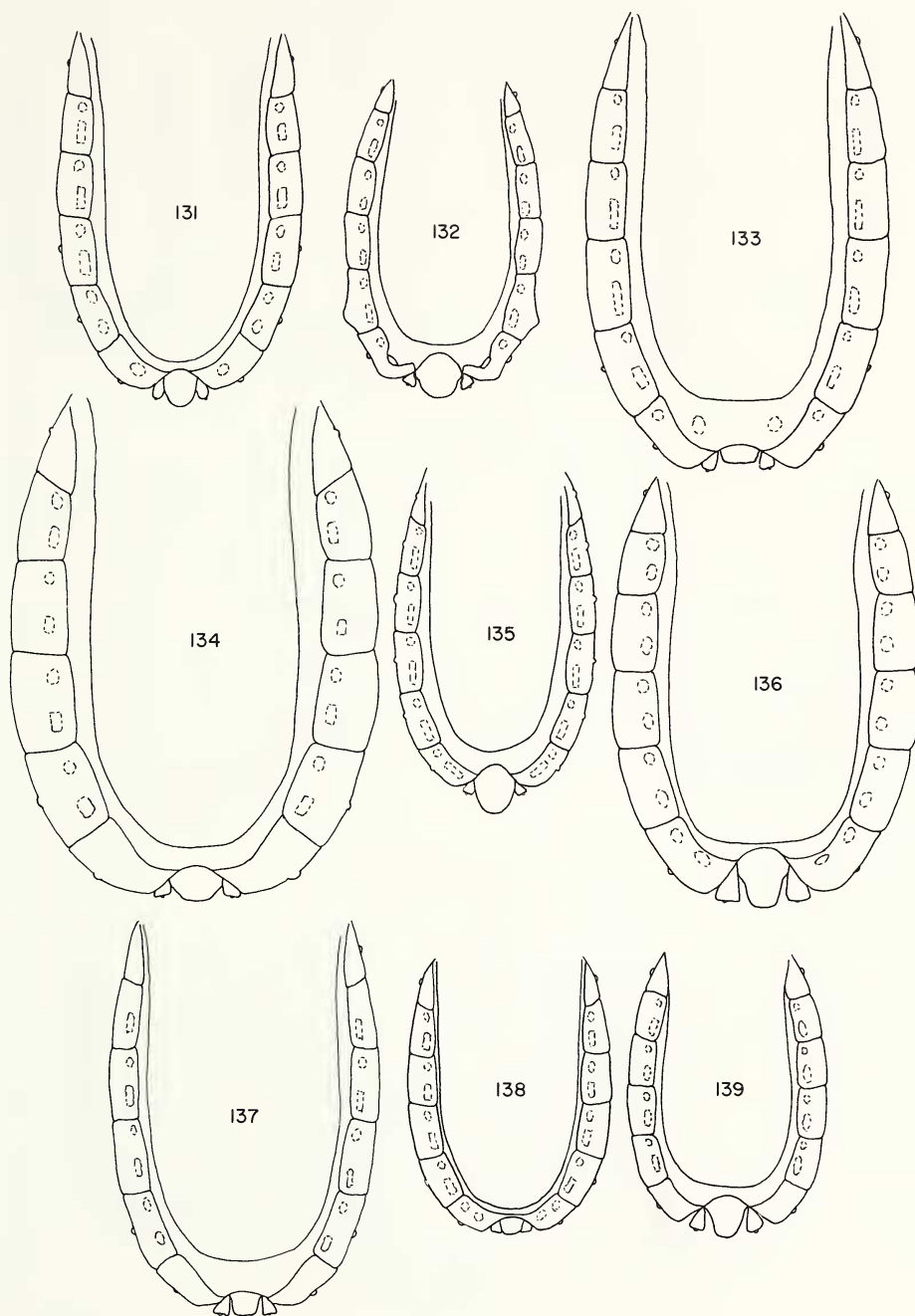


Fig. 131-139. Abdomens: ♂, dorsal view. Fig. 131. *A. aibonitensis*; 132. *A. arizonensis*; 133. *A. borealis*; 134. *A. championi*; 135. *A. dissimilis*; 136. *A. fiskei*; 137. *A. froeschneri*; 138. *A. haitiensis*; 139. *A. inconstans*.

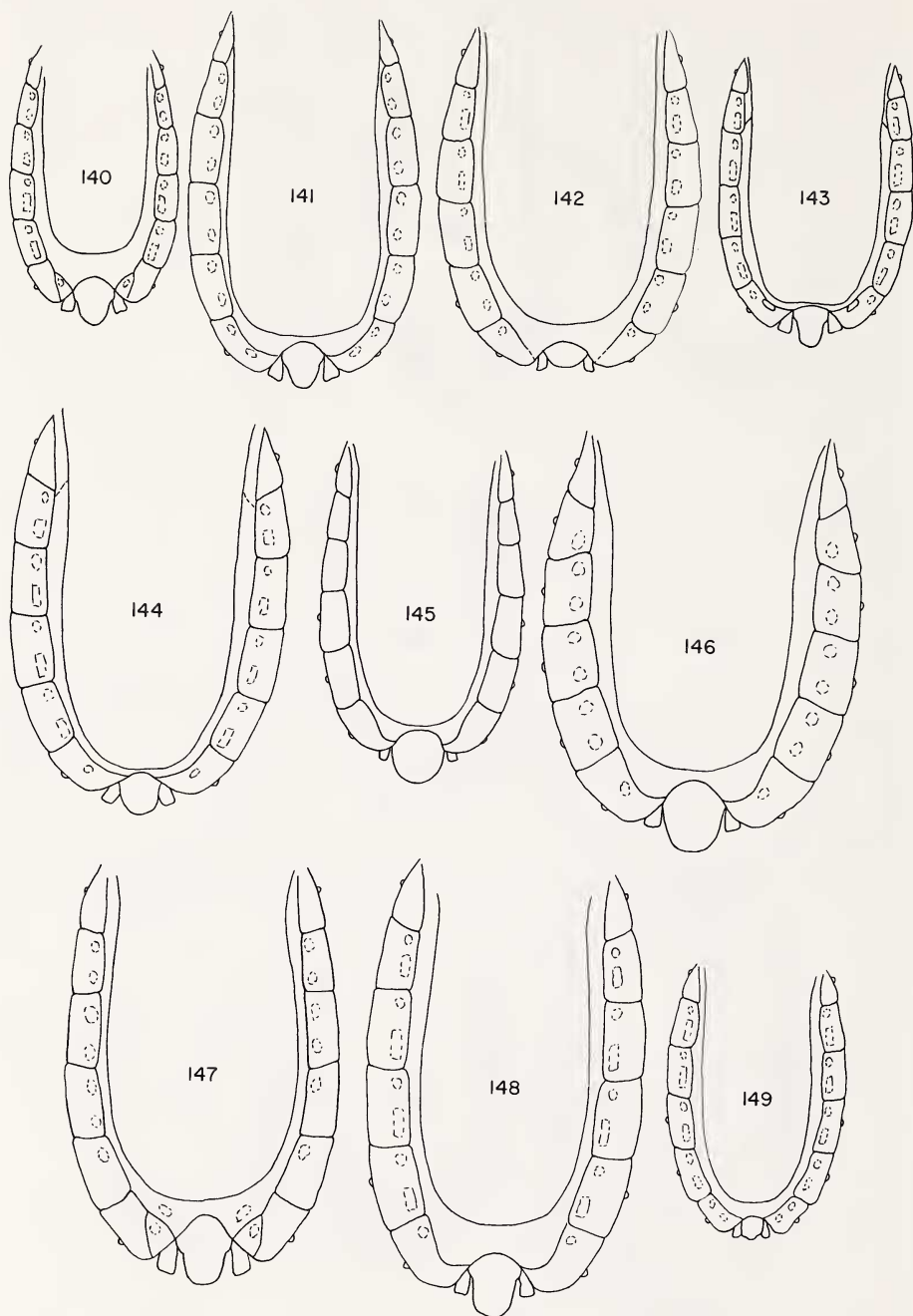


Fig. 140-149. Abdomens: ♂, dorsal view. Fig. 140. *A. leptocerus*; 141. *A. maryae*; 142. *A. minutus*; 143. *A. montanus*; 144. *A. nasutus*; 145. *A. neojamaicensis*; 146. *A. patriciae*; 147. *A. politus*; 148. *A. roseae*; 149. *A. simplex*.

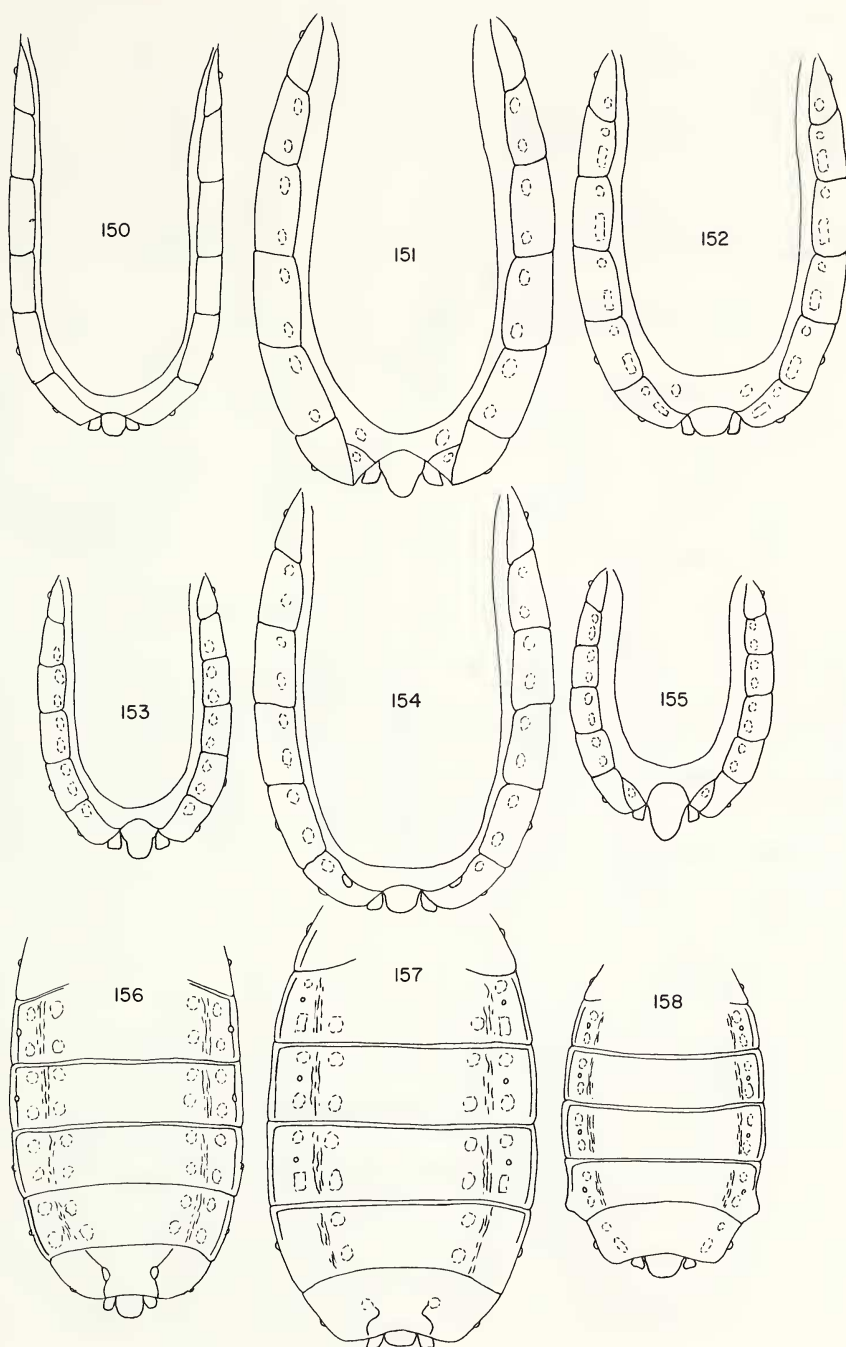


Fig. 150-155. Abdomens ♂, dorsal view. Fig. 150. *A. slateri*; 151. *A. tenuis*; 152. *A. usingeri*; 153. *A. vaurieri*; 154. *A. vera-cruzensis*; 155. *A. wygodzinskyi*. Fig. 156-158. Abdomens: ♂, ventral view. Fig. 156. *A. aibonitensis*; 157. *A. arizonensis*; 158. *A. borealis*.

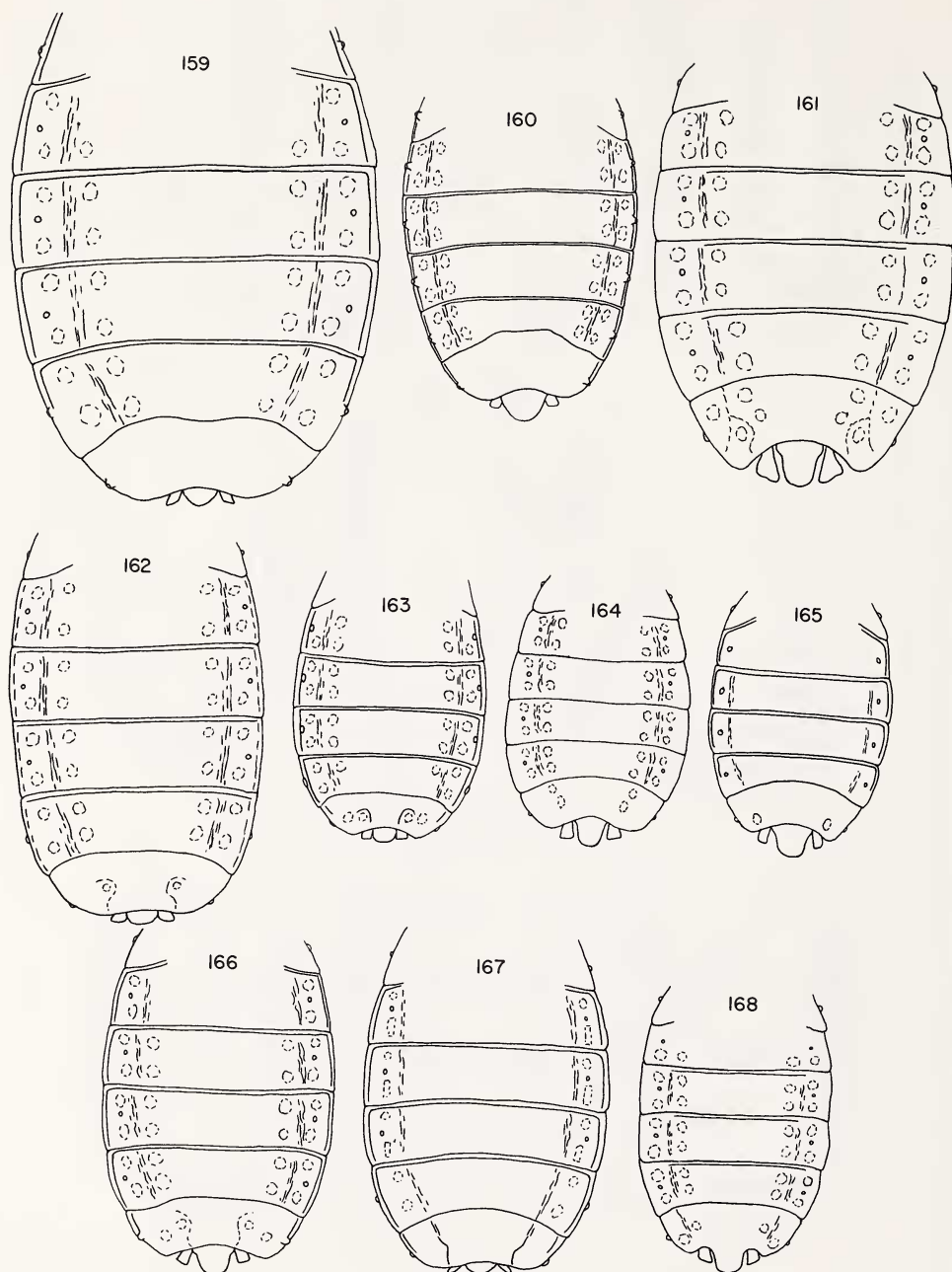


Fig. 159-168. Abdomens: ♂, ventral view. Fig. 159. *A. championi*; 160. *A. dissimilis*; 161. *A. fiskei*; 162. *A. froeschneri*; 163. *A. haitiensis*; 164. *A. inconstans*; 165. *A. leptocerus*; 166. *A. maryae*; 167. *A. minutus*; 168. *A. montanus*.

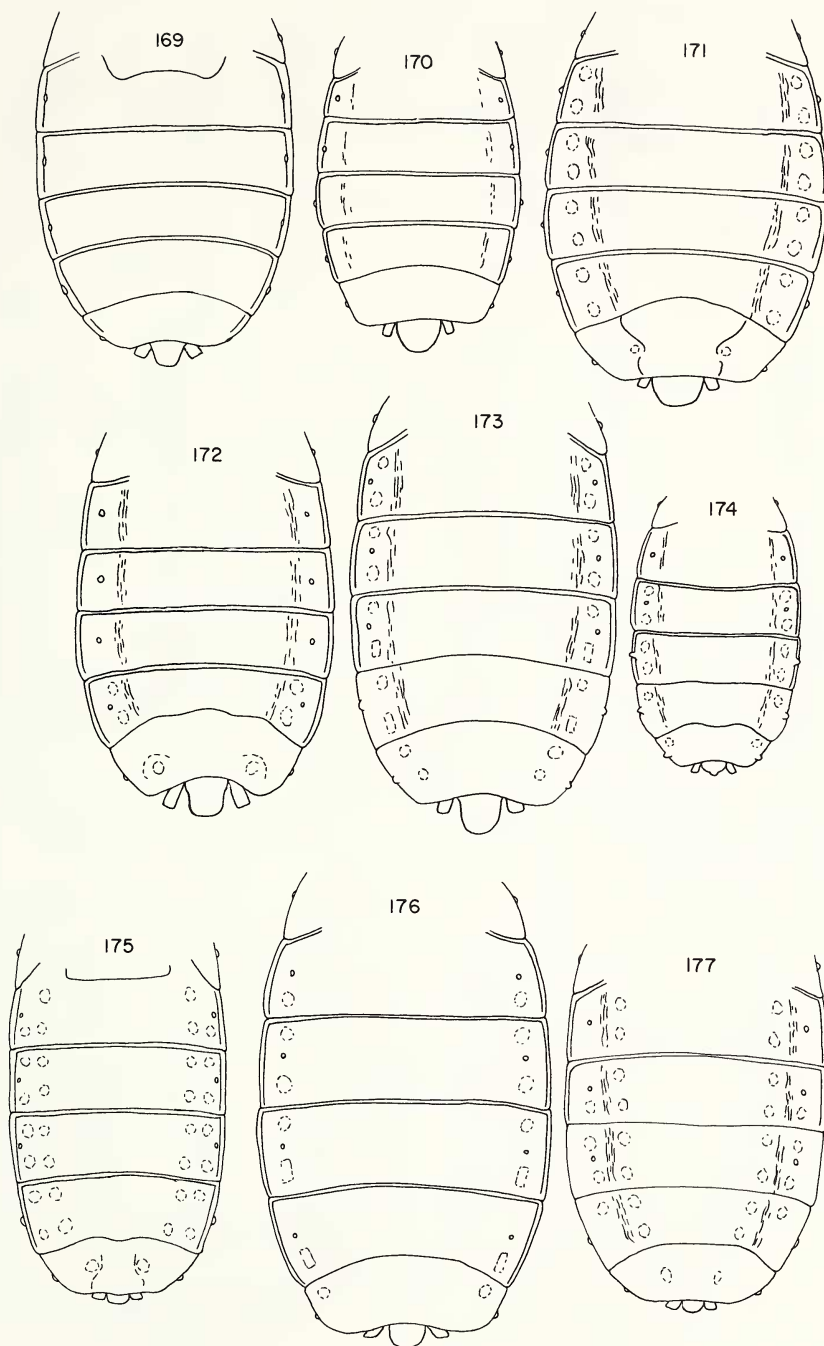


Fig. 169-177. Abdomens: ♂, ventral view. Fig. 169. *A. nasutus*; 170. *A. neojamaicensis*; 171. *A. patriciae*; 172. *A. politus*; 173. *A. roseae*; 174. *A. simplex*; 175. *A. slateri*; 176. *A. tenuis*; 177. *A. usingeri*.

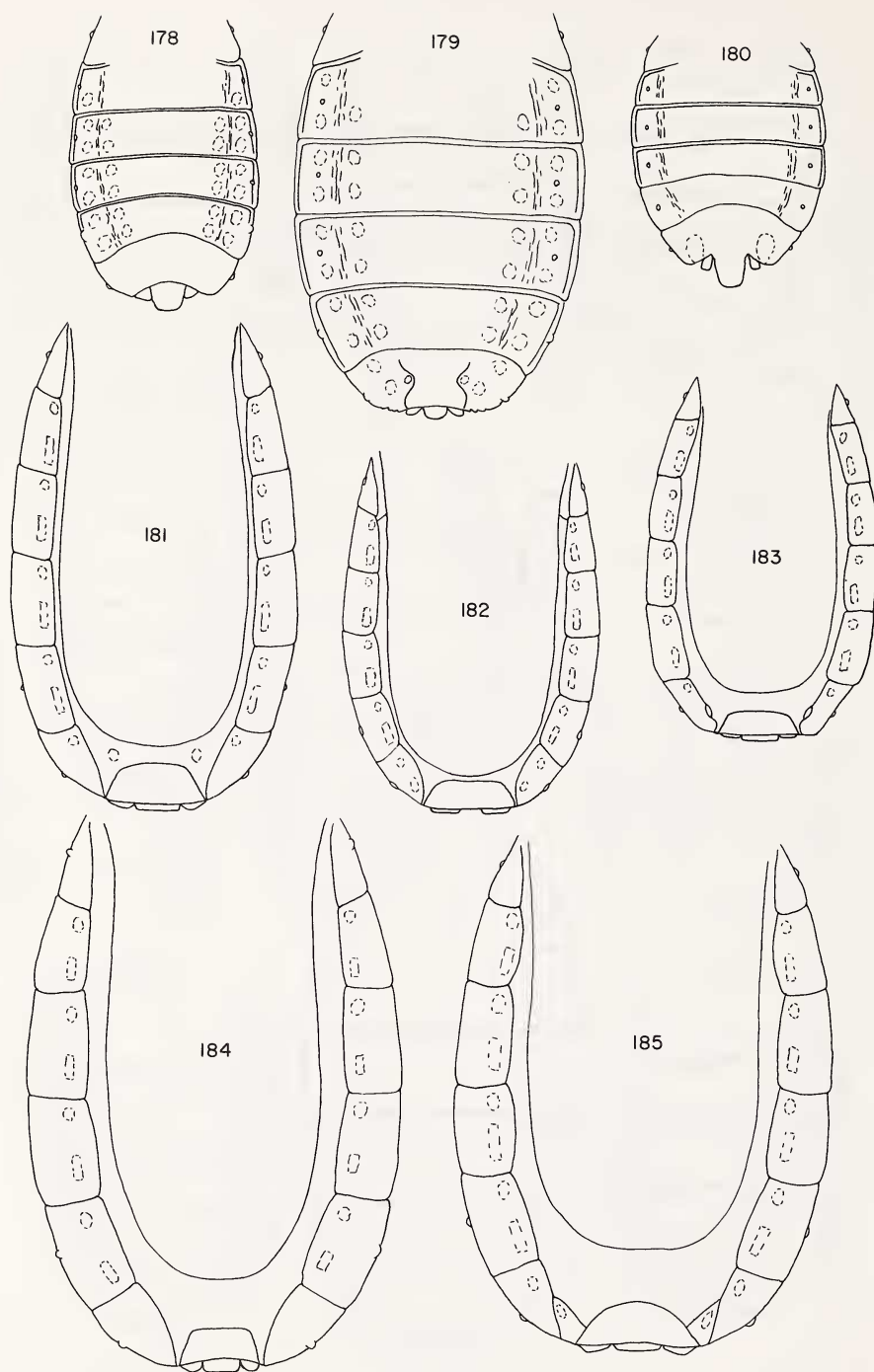


Fig. 178-180. Abdomens: ♂, ventral view. Fig. 178. *A. vauriei*; 179. *A. veracruzensis*; 180. *A. wygodzinskyi*. Fig. 181-185. Abdomens: ♀, dorsal view. Fig. 181. *A. arizonensis*; 182. *A. barberi*; 183. *A. borealis*; 184. *A. championi*; 185. *A. deborahae*.

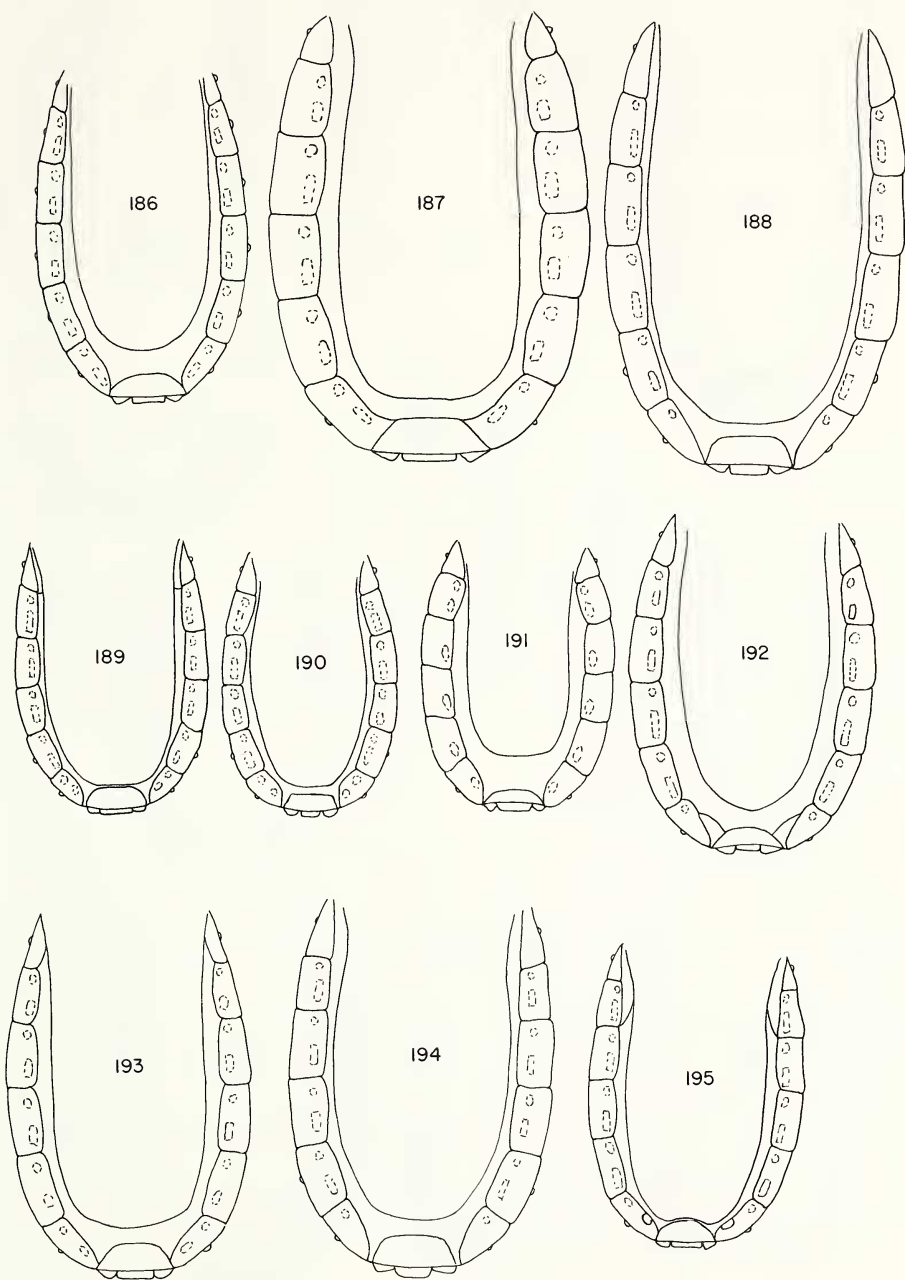


Fig. 186-195. Abdomens: ♀, dorsal view. Fig. 186. *A. dissimilis*; 187. *A. fiskei*; 188. *A. froeschneri*; 189. *A. haitiensis*; 190. *A. hispaniolensis*; 191. *A. inconstans*; 192. *A. leptocerus*; 193. *A. maryae*; 194. *A. minutus*; 195. *A. montanus*.

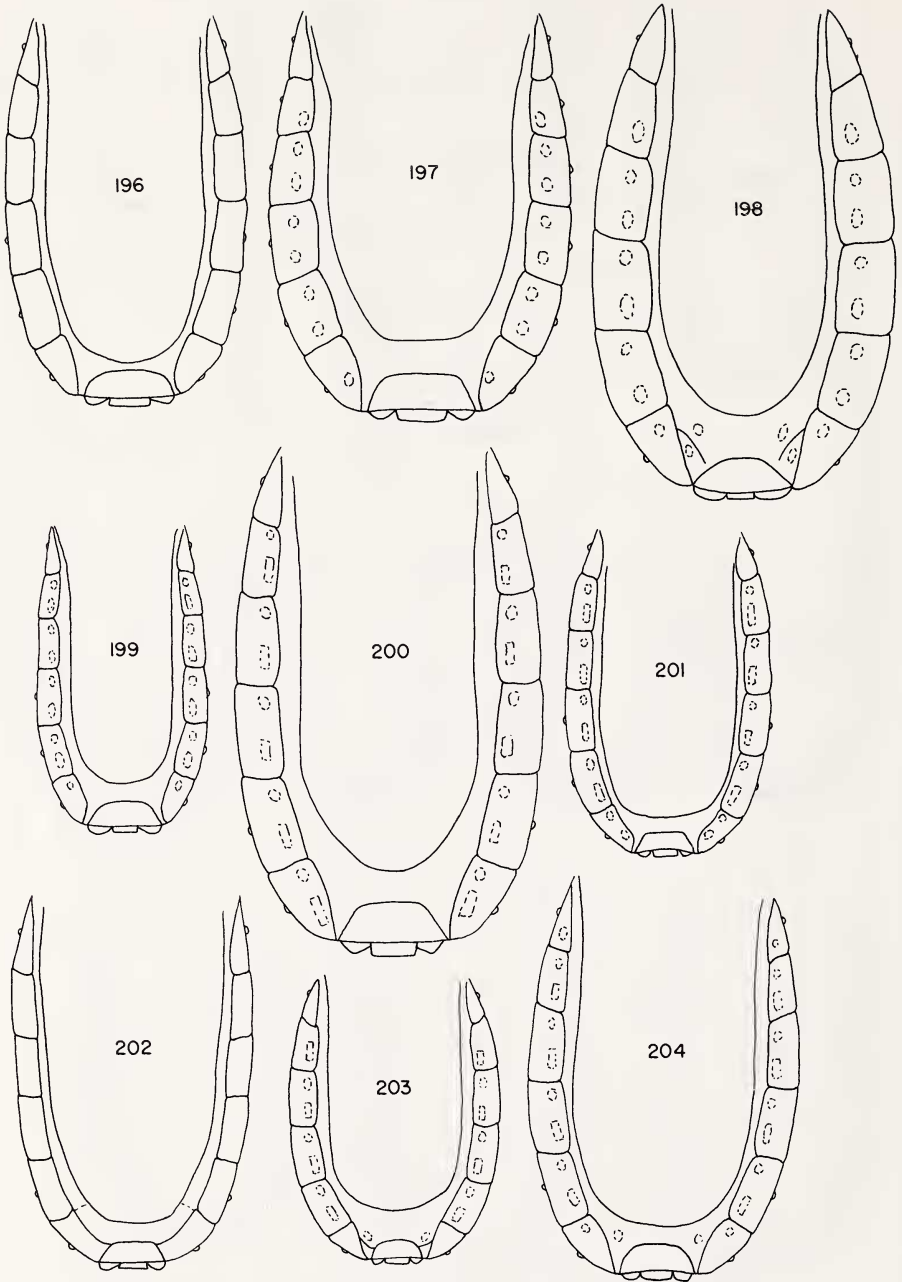


Fig. 196-204. Abdomens: ♀, dorsal view. Fig. 196. *A. neojamaicensis*; 197. *A. patricae*; 198. *A. politus*; 199. *A. pusillus*; 200. *A. roseae*; 201. *A. simplex*; 202. *A. slateri*; 203. *A. tenuis*; 204. *A. usingeri*.

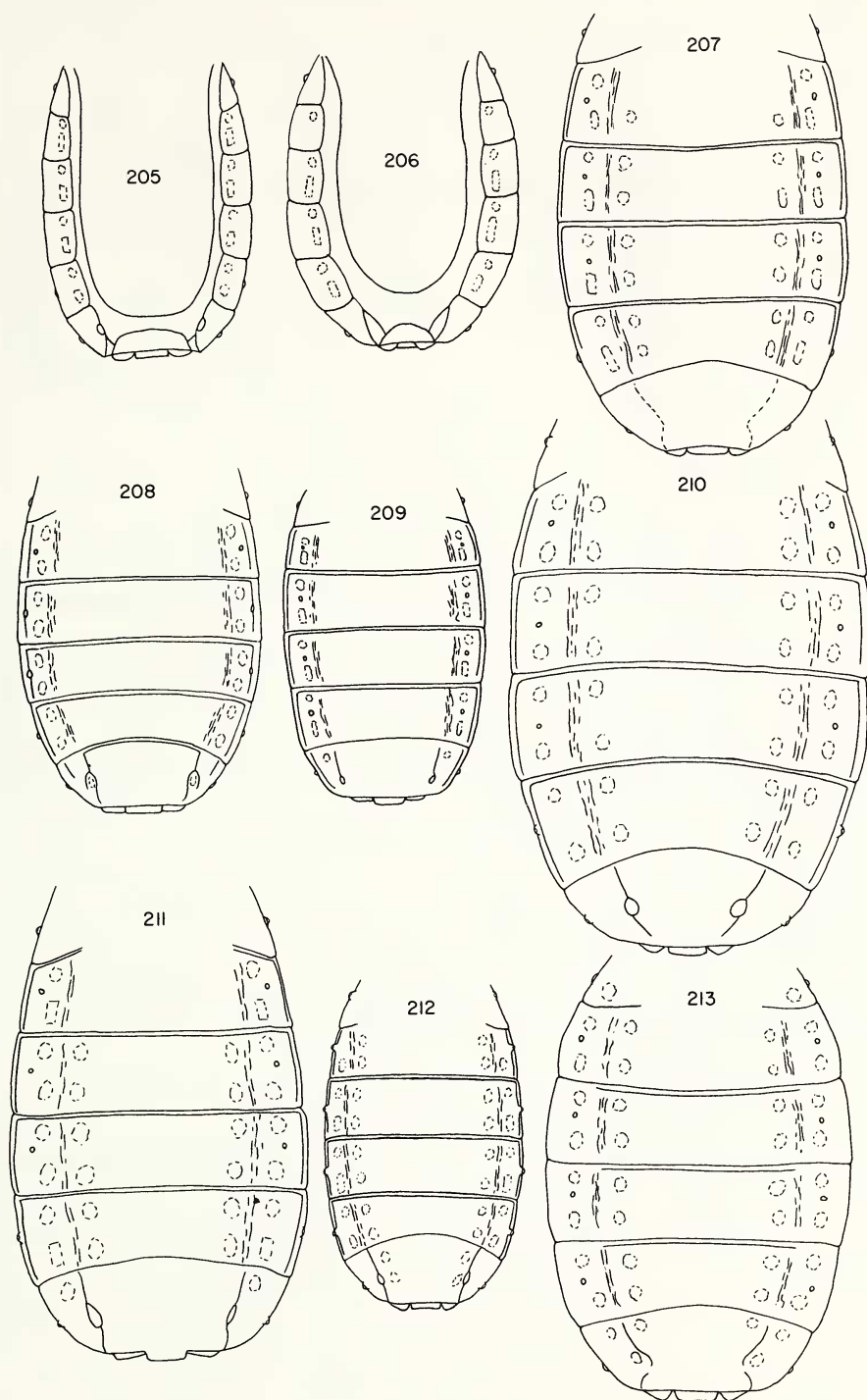


Fig. 205-206. Abdomens: ♀, dorsal view. Fig. 205. *A. vaurieri*; 206. *A. wygodzinskyi*. Fig. 207-213. Abdomens: ♀, ventral view. Fig. 207. *A. arizonensis*; 208. *A. barberi*; 209. *A. borealis*; 210. *A. championi*; 211. *A. deborahae*; 212. *A. dissimilis*; 213. *A. fiskei*.

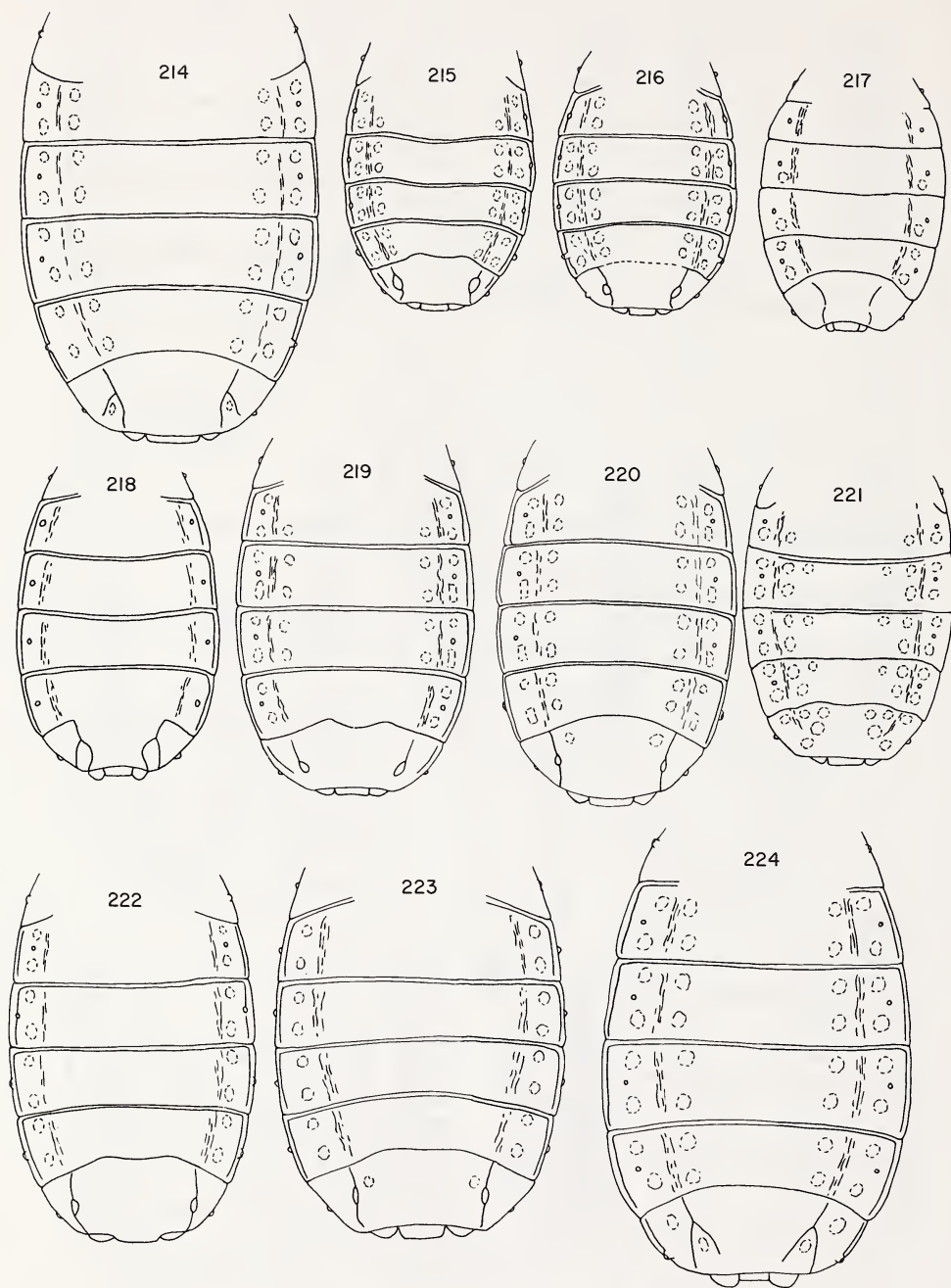


Fig. 214-224. Abdomens: ♀, ventral view. Fig. 214. *A. froeschneri*; 215. *A. haitiensis*; 216. *A. hispaniolensis*; 217. *A. inconstans*; 218. *A. leptocerus*; 219. *A. maryae*; 220. *A. minutus*; 221. *A. montanus*; 222. *A. neojamaicensis*; 223. *A. patriciae*; 224. *A. politus*.

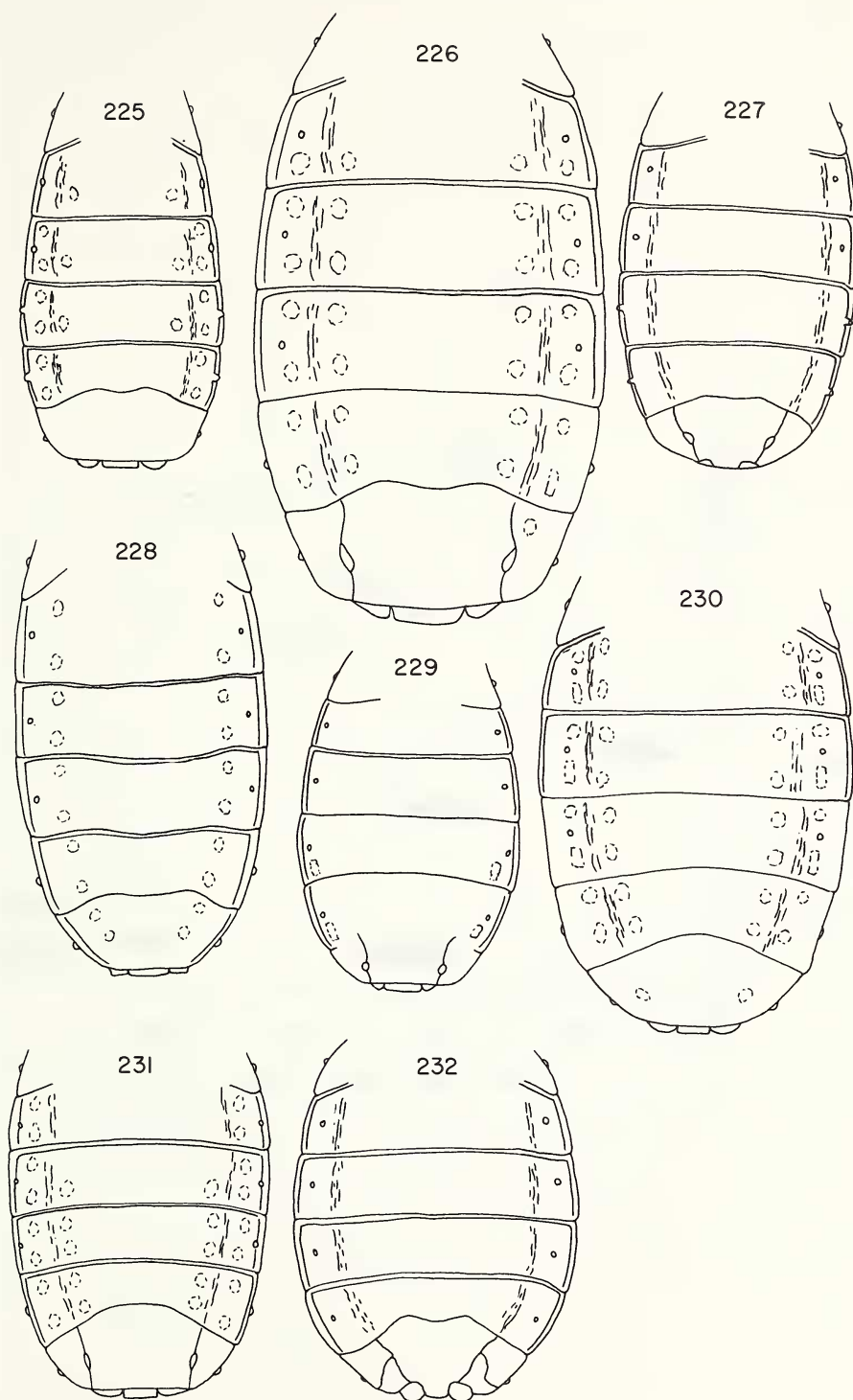


Fig. 225-232. Abdomens: ♀, ventral view. Fig. 225. *A. pusillus*; 226. *A. roseae*; 227. *A. simplex*; 228. *A. slateri*; 229. *A. tenuis*; 230. *A. usingeri*; 231. *A. vauriei*; 232. *A. wygodzinskyi*.

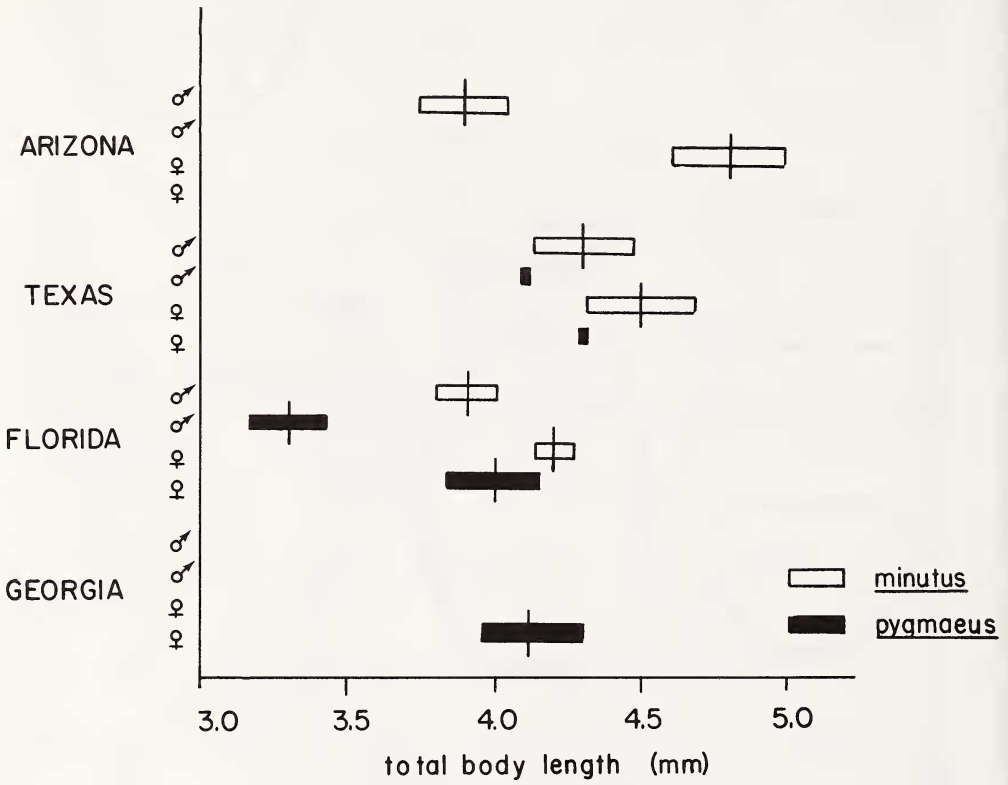
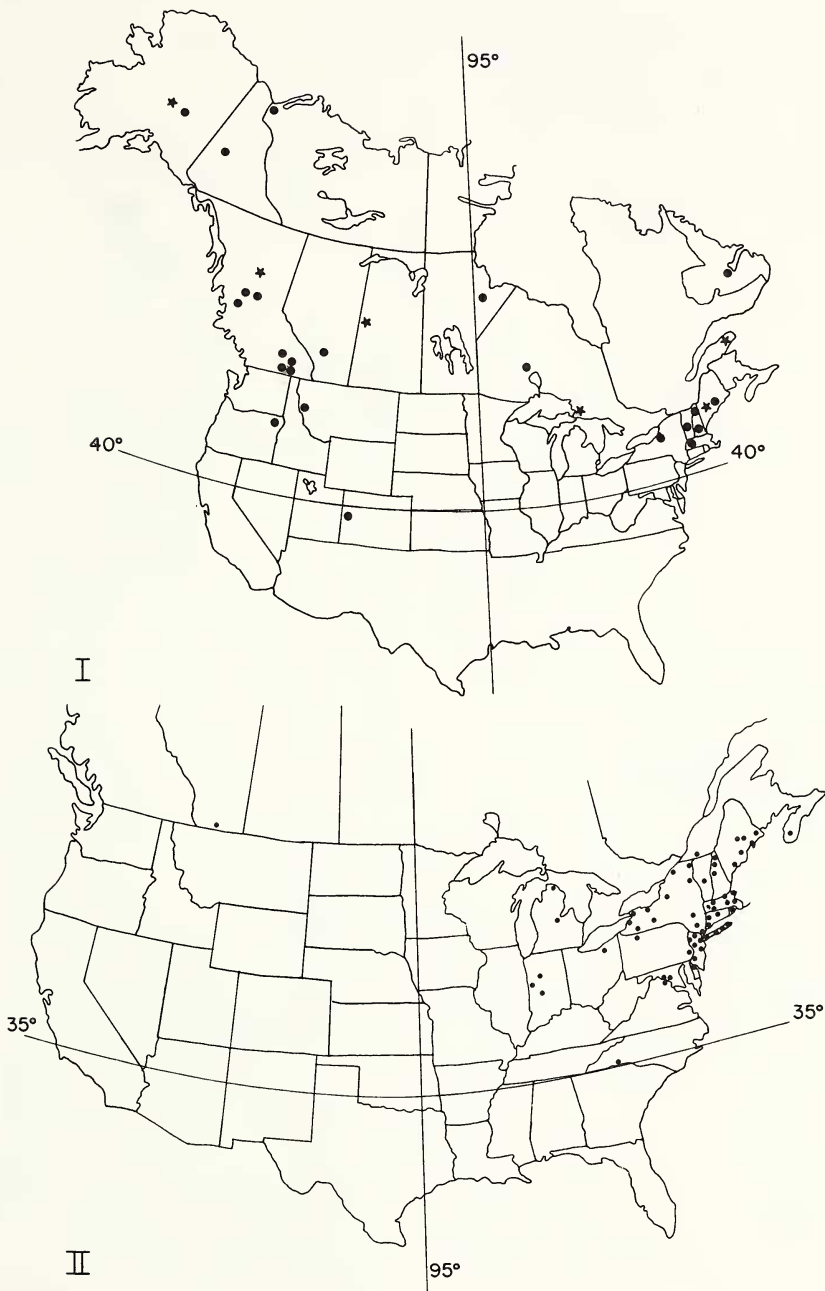


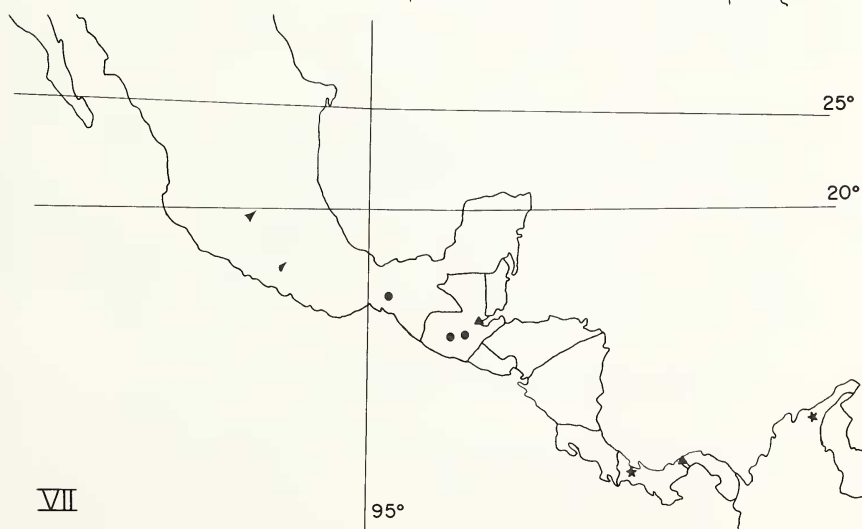
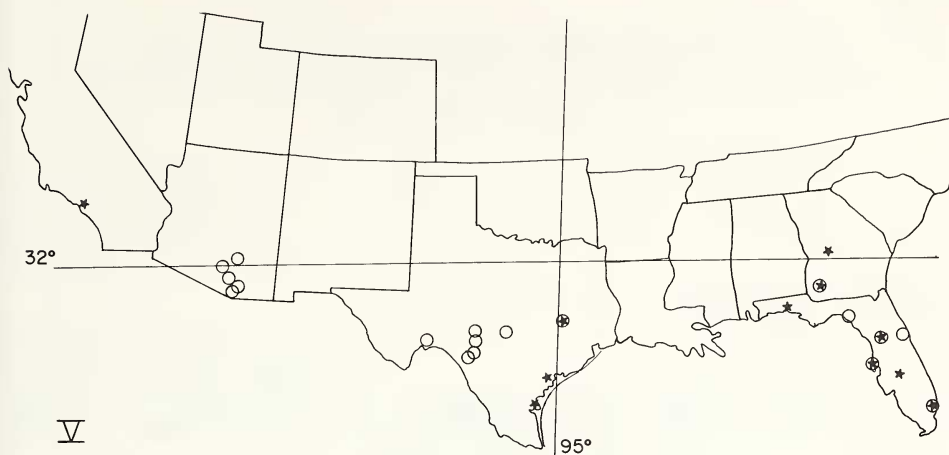
Fig. 233. Variations in total body lengths of *Aneurus pygmaeus* and *A. minutus* correlated with location of population.



Map 1. Distribution of *A. borealis* (★), and *A. simplex* (●). Map 2. Distribution of *A. inconstans*.



Map 3. Distribution of *A. fiskei* (●), *A. slateri* (▲). Map 4. Distribution of *A. arizonensis* (▲), *A. deborahae* (■), *A. politus* (●), *A. roseae* (★).



Map 5. Distribution of *A. minutus* (○), *A. pygmaeus* (★). Map 6. Distribution of *A. championi* (★), *A. froeschneri* (▲), *A. veracruzensis* (●). Map 7. Distribution of *A. dissimilis* (★), *A. leptocerus* (●), *A. maryae* (▲), *A. pusillus* (■).



Map 8. Distribution of *A. barberi*, *A. aibonitensis*, *A. haitiensis*, *A. hispaniolensis*, *A. nasutus*, *A. neojamaicensis*, *A. patriciae*, *A. pisoniae*, *A. vauriei*, *A. wygodzinskyi*. Map 9. Distribution of *A. montanus* (●), *A. tenuis* (▲), *A. usingeri* (★).